CALIFORNIA FISH AND GAME

"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

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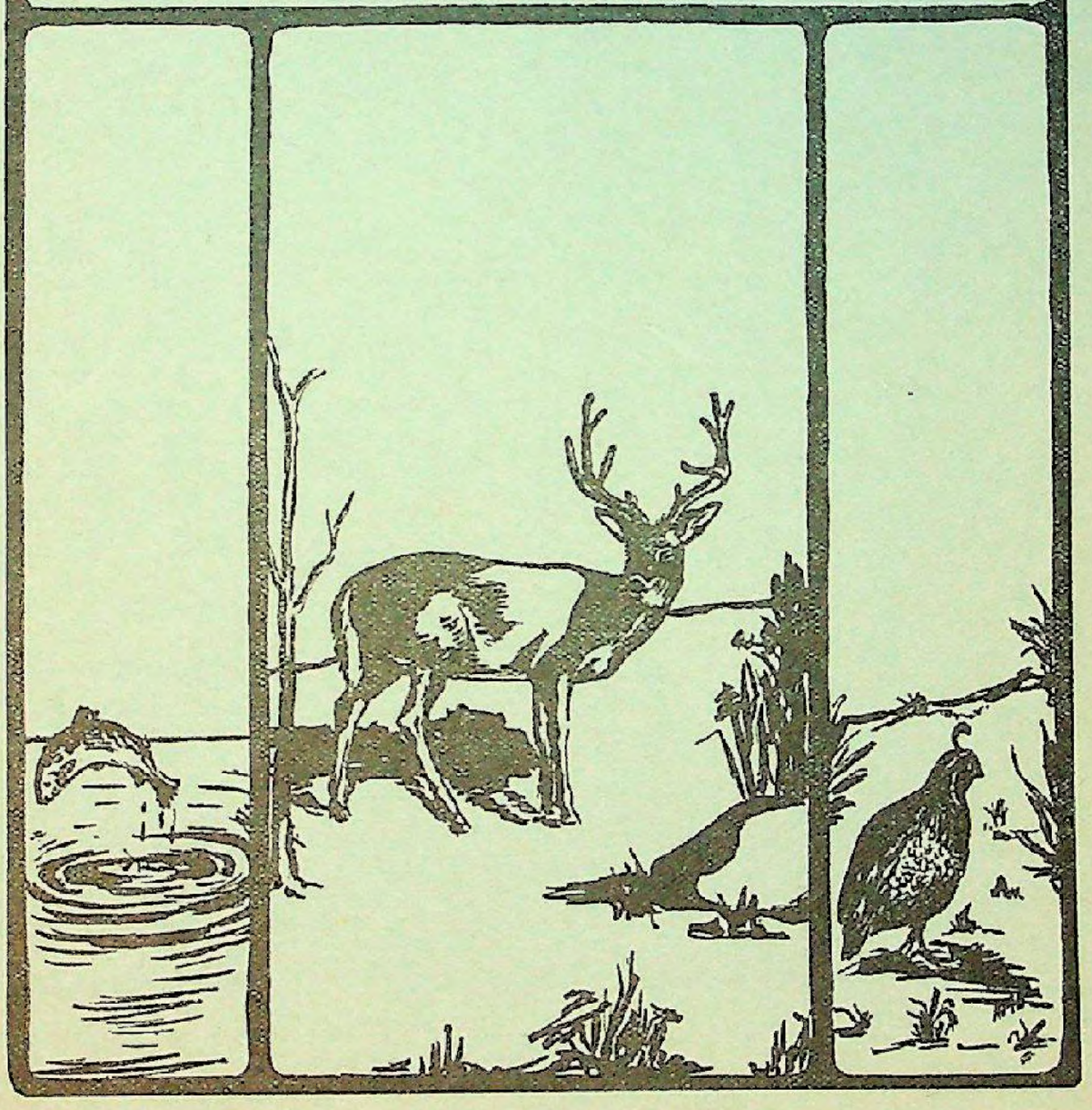

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QUAIL POISONING EXPERIMENTS.

By HAROLD C. BRYANT.

Soon after the United States Public Health Service began a campaign for the eradication of ground squirrels as a check on the dread disease, bubonic plague, fear was entertained for the safety of quail and for birds that might utilize poisoned grain for food. As early as 1915 complaints of the destruction of quail due to squirrel poisoning, caused C. C. Pierce, senior surgeon, and M. F. Clegg, biologist of the United State Public Health Service, to carry on some experiments to determine the amount of poisoned barley fatal to quail compared with that fatal to squirrels. (See CALIFORNIA FISH AND GAME,

Volume II, pp. 11 to 13.) In one of the experiments a quail consumed 280 barley grains containing 40 milligrams of strychnine during a period of 48 hours, and yet the quail showed no symptoms of poisoning. The conclusions reached by these investigations were as follows:

1. California valley quail may be fed under natural conditions relatively large amounts of strychnine sulphate without showing toxic symptoms.

2. The minimum lethal dose by subcutaneous injection is 4 milligrams per 100 grams of body weight.

3. The California ground squirrel (*Citellus beecheyi*) is very susceptible to strychnine sulphate; .09 milligrams per 100 grams of body weight produced convulsions.

4. Nineteen grains of barley containing 2.7 milligrams of strychnine sulphate, when retained in the pouch of the ground squirrel, proved fatal.

5. Poisoned barley as used for ground squirrel eradication does not cause the death of California valley quail under natural feeding conditions.

A few years later after the Bureau of Biological Survey of the United States Department of Agriculture had begun eradication campaigns against squirrels there was so much complaint that further experiments were instituted. Dr. Alexander Wetmore spent several weeks during the summer of 1918 carrying on investigations in the field and at the State Game Farm at Hayward. From a manuscript copy of his report the following summary is taken:

Because of a reduction in abundance of the California quail in recent years serious complaint has been made by sportsmen and others that the birds were being poisoned wholesale during campaigns directed against ground squirrels. In field work it was found that there was no decrease in number in quail in areas covered by poisoned grain. Barley poisoned with strychnine, the bait used for ground squirrels, while often passed over by quail because of its large size and beard, was eaten by them in small amount without ill effect, though mourning doves and band-tailed pigeons were killed.

In the course of experiments one captive California quail was fed 125 kernels of poisoned barley in 24 hours without ill effect though from 10 to 15 kernels was sufficient to kill a fully grown ground squirrel. Though it is possible that very young quail might be more readily affected by the poison, these birds are too small to eat the barley used and so escape.

From observations made it was certain that any decrease in the number of quail must be attributed to illegal hunting and to the use of the automobile by hunting parties. With the opening of the shooting season for mourning doves it is certain that many quail find their way into the game bag as "doves" while during the legal season for killing quail, transportation in autos so facilitates hunting that it is possible to cover much territory in a short time and thus increase the size of the bag. In addition it was evident that in many cases quail were frequently killed by camping parties either while travelling through the country or while established in permanent camps. Any decrease in the number of these birds must be attributed to such agencies.

In spite of the fact that these experiments prove that quail can eat quantities of strychnine without injury complaints of ranchers and sportsmen that poisoning operations were having effect on the numbers of quail have been persistent. An offer by the Fish and Game Commission, a few years ago, of a dollar apiece for all quail poisoned failed to bring in a single poisoned bird. Quail have continued to decrease and it has only been natural that lovers of these famous

game birds should follow up every possibility as to the reason for the decrease. There has been circumstantial evidence a plenty that there might be some connection between poisoning operations and quail decrease, for doves, pigeons and meadowlarks are quite often found in fields where poisoning squads have been at work. To have still more definite information regarding the effect of poison on quail has been the request for some time.

It was rightly pointed out by the Pajaro Valley Fish and Game Protective Association that other kinds of poison than strychnine are sometimes used and that these might be responsible for the death of quail. Accordingly last spring they urged the Fish and Game Commission to undertake some experiments. As a result Mr. F. E. Garlough, in charge of experimental work along these lines for the United States Biological Survey, was asked to undertake experiments and had promised to do so if the Fish and Game Commission would furnish the quail. The Associated Sportsmen's Clubs of California became interested in the matter and offered their assistance. As a result the Fish and Game Commission furnished quail and pheasants, the Associated Sportsmen's Clubs furnished the place and policing for the experiments, and the Biological Survey, with the aid of the State Department of Agriculture, carried on a series of experiments from September 11 to September 23. A series of cages were built near the barns in Golden Gate Park. The Associated Sportsmen's Clubs generously kept a man on the ground night and day to avoid any molestation of the birds and to carefully keep track of any symptoms that might develop.

It is hoped that the results of these experiments will be published in full by the government. At this date the following results can be reported:

1. Quail do not care for barley and will not eat it except when starved for nearly 24 hours. If a choice of grains is provided, groats is eaten first, wheat second, and barley taken only under pressure of hunger.

2. One quail was fed 280 grains of strychnine-poisoned wheat in three days, 150 kernels being taken in one day. The bird continued in apparent good health during and after the experiment. Two other birds were fed 200 kernels of double standard strength barley and showed no symptoms of poison. A full meal of poisoned grain daily failed to injure birds in the slightest degree.

3. A mineral poison, a thallium compound sold under the trade name of "Zelio" recently imported from Germany but little used as yet, is known to be a slow poison. At the end of four days no poisoning symptoms had appeared but death followed eventually. On the other hand, one bird fed 100 kernels, a heavy dose representing $\frac{5}{3\frac{1}{2}}$ of a grain, showed symptoms of sickness the following morning and died in a little over 24 hours without a struggle.

4. As might be expected phosphorus used as poison kills quail very quickly. Twenty-five kernels of oats or wheat, representing $\frac{1}{5}$ to $\frac{1}{3}$ of a grain, caused death in from one to two hours. One bird, which took only five kernels, representing about $\frac{1}{25}$ of a grain, died with convulsions after about three hours.

TABULATED SUMMARY.

Poison material	Number kernels	Amount poison	Time fed	Time eaten	Kind of quail	Effect	Time to kill
Strychnine B. S. (1-16)	Barley 50	0.08 grain	13/10:00 a.m.	14/ 3:00 p.m.	Young male and female		
Strychnine Double B. S.	Barley 200	0.56 grain	16/ 4:20 p.m.	17/ 4:00 p.m.	Young male and female	None	
Strychnine Double B. S.	Barley 50	0.14 grain	13/10:00 a.m.	14/10:30 a.m.	Young male	None	
Strychnine Commercial (a)	Wheat 100	0.158 grain	14/10:00 a.m.	15/ 9:00 a.m.	Adult female		
Strychnine Commercial	Wheat 100	0.158 grain	16/10:00 a.m.	16/ 2:00 p.m.	Adult female	None	
Strychnine Commercial	Wheat 50	0.079 grain	13/ 2:00 p.m.	14/10:30 a.m.	Adult female		
Strychnine Commercial	Wheat 100	0.158 grain	14/11:15 a.m.	14/ 3:00 p.m.	Adult female		
Strychnine Commercial	Wheat 150	0.237 grain	15/10:00 a.m.	15/ 5:00 p.m.	Adult female	None	
Strychnine County (b)	Wheat 150	0.192 grain	15/10:30 a.m.	18/10:00 a.m.	Adult male	None	
Strychnine County	Wheat 150	0.192 grain	16/10:00 a.m.	16/ 5:00 p.m.	Adult male	None	
Strychnine Commercial	Wheat 150	0.198 grain	20/10:00 a.m.	21/ 3:00 p.m.	Adult male	None	
Phosphorus (d)	Oats 25	0.20 grain	16/ 3:00 p.m.	16/ 3:45 p.m.	Adult male	Died 5:04	1½ hours.
Phosphorus	Wheat 8	0.048 grain	16/ 3:00 p.m.	16/ 4:00 p.m.	Adult female	Died 6:05	2½ hours.
Phosphorus	Oats 5	0.04 grain	17/10:15 a.m.	17/11:00 a.m.	Adult male	Died 2:18	3¾ hours.
Phosphorus Commercial (e)	Wheat 10	0.02 grain	22/ 3:00 p.m.	At once	Adult male	Died 8:15	5¼ hours.
Arsenic (f)	Groats 100	0.25 grain	18/10:00 a.m.	At once	Adult female	Died 2:36	4½ hours.
Thallium Sulphate (g)	Groats 100	0.277 grain	14/10:15 a.m.	14/ 3:00 p.m.	Young female	Died 15/10:30 a.m.	22 hours.
Thallium Sulphate (h)	Groats 100	0.277 grain	17/ 4:00 p.m.	At once	Adult female	Died 20/ 9:00 a.m.	65 hours.
Thallium Sulphate	Groats 50	0.138 grain	15/ 4:40 p.m.	At once	Young female	None to 3:00 p.m. 18th	
Thallium Sulphate	Groats 100	0.277 grain	18/ 3:00 p.m.	18/ 3:00 p.m.	Young female	Died 3:25 p.m. 19th	23 hours.
Thallium Sulphate	Groats 75	0.207 grain	16/ 3:45 p.m.	By 4:30 p.m.	Young male	None to 30th	
Thallium Sulphate	Groats 25	0.069 grain	30/ 8:00 a.m.	At once	Young male		
Thallium phosphate	Groats 25	0.069 grain	30/ 4:00 p.m.	At once	Young male	None yet	
Thallium Sulphate	Groats 25	0.069 grain	Oct. 1/8 a.m.	At once	Young male	Sick at 6:00 p.m. 1st and died during the night.	

NOTES.—Strychnine B. S. (1-16) means the Biological Survey Standard formula 1 oz. strychnine to 16 quarts whole barley.
(d) Phosphorus grain mixed according to the usual formula.
(f) Arsenic grain mixed according to the usual formula.
(g) This poison not on the market yet. Grain mixed about the strength which it would have to be used in California.
(h) The action of this bird shows the accumulative effect of thallium sulphate. Bird in good condition from September 20th to 30th.

FIG. 37. Valley quail, California's finest upland game bird.

5. Arsenic although slower than phosphorus is fatal. A quail was fed 100 kernels of groats poisoned with arsenic the total representing about $\frac{1}{5}$ grain. Within two hours the bird was drowsy; three hours later it was unable to stand, and within four hours and a half it was dead.

Conclusion.

Every person interested in the preservation of quail need have no fear regarding squirrel poison if it be the government formula using strychnine on whole barley but they should protest the use of any other kind of poison, particularly if wheat or oats are used. Fortunately it can be confidently stated that the dangerous poisons are not as effective with ground squirrels as is strychnine and that their use has consistently been opposed by the rodent control experts of the government.

DISTRIBUTION OF THE PRONGHORNED ANTELOPE IN CALIFORNIA.*

By E. W. Nelson.

During the middle of the last century when the gold rush took place, antelope were generally distributed and very abundant on the plains of California, especially in the San Joaquin Valley and over the Mohave Desert region, ranging thence south to the Mexican border; also on the arid plains in the northeastern part of the state. In 1923 they had been reduced to small bands in six widely separated areas, containing a total of about 1057 animals.

Although the intensive occupation of California is making nearly all parts of the state impossible for the presence of antelope in a state of freedom, there are a few areas within which herds might be perpetuated, especially in the northeast. Fortunately, the State Fish and Game Commission is taking an active interest in the matter, as is also the committee for the conservation of wild life of the California Academy of Sciences.

At the Washington Antelope Conference F. M. Newbert, president of the Board of Fish and Game Commissioners, stated that for a long time the game commission has taken an active part in trying to safeguard the surviving antelope. At one time the Mount Dome herd (No. 1 on the map) had dwindled to 11 animals. Through the interest of the commission in safeguarding these animals by its warden service the number has been increased until now there are about 118. Mr. Newbert expressed a desire to cooperate with the Biological Survey and also with the authorities of the states of Nevada and Oregon in any practical way to perpetuate and if possible increase the antelope herds. It will be difficult to perpetuate the four small herds in the southern part of the state, but in the northeast there is greater promise of success.

A correspondent who visited northeastern California in the fall of 1922 stated that three-fourths of the dry farms have been deserted

* From Status of the Pronghorned Antelope, 1922–24. U. S. Dept. Agric., Dept. Bull. No. 1346, pp. 25–27.

FIG. 38. Part of the Mount Dome herd of antelope, the last large herd left in California. Careful protection is being given these antelope. The picture shows 87 animals and was taken by Deputy J. O. Miller in December, 1921, during winter feeding operations.

in that region, which naturally tends to restore favorable conditions for the antelope. The committee for the conservation of wild life of the California Academy of Sciences has raised funds for feeding the Mount Dome antelope in severe winters and has joined with the State Game Commission in having game wardens protect them from poachers. It is planned to try to have an antelope refuge established for their benefit. M. Hall McAllister, chairman of that committee, wrote on July 16, 1924: "By reason of the remarkably open winter of 1923–24 the Mount Dome herd remained scattered and did not band up as they usually have done: therefore, no tally was possible on them as has been usual. Also by reason of the small rainfall and few heavy storms in California the Lassen herds (No. 2 on the map) have migrated across the line into Nevada, and in July, 1924, not over a dozen were sighted on their old grounds in Lassen County, although some 500 are reported ranging in the neighboring part of northwestern Nevada."

No doubt the shifting of the Lassen County herds to the adjacent part of Nevada was caused by shortage of feed in the California area, and these animals may be expected to return to Lassen County as soon as adequate rainfall again restores the proper forage conditions. For this reason this herd is being credited to California, which appears to be their natural home. Fortunately, the area they have gone to in Nevada lies within the antelope refuge established in 1923 by the governor, thus affording them protection.

In California, as elsewhere, coyotes and other wild animals prey upon the diminishing herds of antelope, as upon other wild life. Wherever it is practicable the Biological Survey is having its field leaders give special attention to the destruction of predatory animals endangering the surviving herds of antelope and other large game. Hunter Fay Clark, working cooperatively for the Biological Survey and the California Department of Agriculture in the Mount Dome district, has been successful in destroying coyotes which have been preying on the antelope and deer of this district. The inroads of these pests undoubtedly account for the slow increase of this herd. In a single month, in the range of these antelope, Mr. Clark killed 35 coyotes. The result of his work will undoubtedly become apparent in an increase of the game animals of that district, as has been the case following similar work in other parts of the west.

The detailed information concerning the distribution and number of antelope now in California has been supplied mainly by M. Hall McAllister, of the California Academy of Sciences; George Neale, executive officer of the California Fish and Game Commission, and F. E. Garlough, of the rodent-control section of the Biological Survey.

The distribution of antelope in California is approximately as follows:

1. John O. Miller reported on February 28, 1923, that the Mount Dome herd contained about 118 antelope. They range on the plains in the southern end of Lower Klamath Lake, near Mount Dome in Siskiyou County, probably the most favorable area in California for perpetuating antelope under natural conditions. For some years the herd has had the attention of the State Fish and Game Commission and other conservationists, as set forth above, and with the destruction of predatory animals in that district should increase in numbers.

2. The Lassen County antelope, scattered in numerous small bands on Madeline plains, in Dixie Valley, Secret Valley, and other points, range eastward into the Smoke Creek Desert of Nevada. These were counted by W. J. Lee, who reported on September 29, 1923, that they aggregated 864 animals. Since then it has been reported that most of these animals have crossed the state boundary into the adjacent part of Nevada, as a result of failing forage due to the excessively dry season of 1924. They will undoubtedly return with the restoration of more favorable conditions.

3. In 1922 two small bands, totalling 29 animals, were reported as ranging between Mendota and Panoche Creek, on the west side of the San Joaquin Valley, in Fresno County.

4. A band of about 30 was located in 1922 between Granite Wells and Randsburg, on the Mohave Desert, in San Bernardino County.

5. In 1922 a band of 11 lived in Antelope Valley on the Kern-Los Angeles refuge, ranging over adjacent parts of Kern and Los Angeles counties. In April, 1924, 13 were reported as having been seen between Willow Springs and Liebre Ranch, on the west side of the valley in Kern County.

6. A band of 5 was reported in 1922 ranging in the desert north of the state highway between Campo and Imperial, in Imperial and San Diego counties. These animals probably range back and forth across the Mexican border.

THE ROLE OF OXYGEN IN WATER POLLUTION.

By Dr. Clive M. McCay.

Every boy knows that a fish lives in water and eats in water. Many forget that he breathes in water. The natural question arises, "What does he breathe?" The answer is—that he breathes the same gas, oxygen, that all animal life has probably consumed since the first breath was drawn and the joy of living and breathing was first experienced. A fish may live many days without food; he may consume his own body in order to swim but he can live but a short time without oxygen.

One of the simple classical experiments to show the need of a living body for oxygen and to show the identity of this need with that of a flame consisted in placing two mice in separate jars. In one of these jars was also placed a lighted candle. Both jars were then sealed. In the one containing the mouse and the lighted candle the candle went out and the mouse quickly died. In the other jar the mouse lived for a considerably greater time. Both mice needed oxygen. The flame also needed oxygen. The mouse enclosed with the candle died more quickly because the candle had used up part of the available oxygen. A recent mining bulletin shows that the miners' lamp is a good detector of low oxygen in the mine. The flame of the lamp will go out when the oxygen reaches a value of 15–16 per cent while the life of man is not endangered until it reaches 12 per cent. As normal air is about 21 per cent oxygen this danger line is slightly greater than half the normal value.

Oxygen in the water, which serves the fish quite like our atmosphere, is dissolved as a gas from the air above the water. At ordinary room

temperatures a gallon of fresh water can hold about 1.566 cubic inches of oxygen. Under the same conditions sea water will hold less oxygen. A gallon of sea water would hold only about 1.266 cubic inches.

There are two ways in which the oxygen supply of any body of water can be replenished. If there were no means of dissolving a new supply constantly, the fish and other aquatic animal life would quickly exhaust the small capital which is held by the waters. Winds are constantly stirring the surface of the water; temperature changes produce currents which stir the water; the tides ebb and flow spreading the water over vast stretches of flats; river waters flow over rocks. All this motion results in constant aeration of the water. Water with a low oxygen content is constantly being exposed to the air where it absorbs all it can hold.

Another source of oxygen for the water is that derived from the green aquatic plants. These function in the same manner as their terrestrial relatives. They remove carbon dioxide from the water. With the aid of the sunlight they build up the complex carbon compounds that comprise their structures and furnish part of the resulting oxygen to resupply the water.

In this cycle we see a replica of that on land. The fish breathes oxygen and burns up his food as he swims through the water. The burned food, like the gasoline from an automobile, is rejected as waste carbon dioxide. This waste carbon dioxide is taken up by the plants which thus use it to store up energy from the sunshine and throw the resulting oxygen back into the water.

In the green algae we see the enemy of our boyhood. The floating green masses on the surface of ponds were always considered a nuisance because they prevented our locating the turtles on the bottom until we stepped on them with our bare feet. Little did we realize that the green masses, which we believe to be the excreta of frogs, were serving as active agents in removing the carbon dioxide formed from the rotting of leaves on the pond bottom.

An interesting superstition arises in this connection. In many streams and ponds after a heavy thunder shower fish are found floating on the surface of the water. The farm boys are told that hail or lightning struck the fish. The real reason for this is that the large amount of rotting leaves and other partly decayed organic matter which is washed into the streams by a sudden thunder shower continues to decay using up the oxygen and setting free carbon dioxide. The fish are poisoned by the carbon dioxide and have no oxygen to breathe. Thus they are left in the same condition as the mouse in the jar with the lighted candle, and die very quickly.

A popular misconception is that all organic matter serves as fish food. There is no doubt that a certain amount of meat or fish residue can be thrown into water and will function as fish food. An excess may be thrown in at any moment, however, and this proceeds to decay. In the process of decaying the dissolved oxygen is quickly consumed and the water is quickly charged with carbon dioxide. In this event the fish must either migrate or die from lack of oxygen. For this reason the fish life of an entire region may disappear. If the organic matter continues to be dumped the aquatic life may be removed for many years. The reestablishment of a given species may be very slow due

to the complex chain upon which the fish is dependent. The fish may be dependent upon a certain plankton for its food; the plankton is in turn dependent upon some other living form and this in turn upon another. Thus an intricate chain is established. If the organic pollution depletes the oxygen supply to such an extent that any living link of the extensive chain is destroyed, the whole chain must die or migrate.

Sewage may be the source of organic matter that destroys fish life in either rivers or coastal waters. Whether it does so depends entirely upon the abundance of diluting waters to resupply the oxygen. The other sources of oxygen, the plant life, is often in evidence like the vast green growths seen near the outlet of the Oakland sewers. A prominent sanitary engineer has estimated that water can become offensive in odor from sewage only when the available oxygen is reduced to 20–30 per cent of the normal value. This is too low a figure for normal fish life.

The question of pollution of waters by decomposition of organic matter is one that confronts the California Fish and Game Commission as well as all other public spirited bodies of people that are interested in genuine conservation. An increasing population may increase industrial pollution and is certain to increase the organic wastes of sewage. Sewage and organic pollution have long attracted the attention of public health departments but have attracted little attention from those interested in fish conservation. Extensive financial losses in the east have forced the question upon those interested in oyster culture. No such shock will awaken the fishing industries because both the increase of pollution and the resulting decrease of fisheries will be a slow change over a period of years. Thorough study of the oxygen content of waters and the oxygen requirement of fishes by competent investigators is the only possible means of forestalling such disastrous pollutions. Such studies must be made in the laboratory under controlled conditions to secure sound scientific data which can then be applied through field studies of natural conditions.

If fish are sealed in a tank and the water analyzed for oxygen at different levels, the fish will show excitement when half the original oxygen has been used up. They realize they are in the same position as the mouse sealed in the jar. Numerous reactions which lead to interesting speculations regarding instincts of fishes are obtained when they are under reduced oxygen concentrations. When the oxygen is reduced to a third the original amount, all fishes become extremely restless. The goby and catfish who have been lying on the bottom rise to the top. If a single bubble of air has leaked into the apparatus the goby sticks his nose into it and hangs perpendicularly without an apparent movement. The catfish on the other hand will rise, take the bubble of air in his mouth and juggle it like a child does a piece of candy trying to make it last as long as possible. The bass, smelt and trout on the other hand will swim violently back and forth near the surface of the tank, but will seldom nose into the air supply. The hag fish who usually lies coiled in a spiral will straighten out and lash the water with his long tail. The shark makes violent rushes at the surface. Even the flounder leaves the bottom and plunges at the top. As the water goes lower in oxygen and attains a value of $\frac{1}{3}$–$\frac{1}{4}$ the original amount, the fish gradually lose their equilibrium and sink to

the bottom. The gills may move for several minutes before they cease. After this there is a violent quivering of the fins, especially the pectorals, and the fish is dead. The lowest level a fish can stand is quite consistent for the members of the same species. There is a decided gradation in the toughness of species. Some can exhaust the water to a point where it contains only a third the oxygen present when others die. The length of time fish live in air has been found to be inversely proportional to the amount of oxygen they consume in water.

At every stage of his life the fish, as well as other animals, requires oxygen and throws off carbon dioxide. Even the egg respires and uses up enormous amounts of oxygen when its weight is considered. The oxygen requirement of a fish increases with the temperature. For each ten degree centigrade increase in the temperature of the water the fish doubles his oxygen requirement. Since organic matter decays more rapidly and increases the oxygen it consumes in the same temperature ratio as the fish, we find the fish will die more quickly at a higher temperature if it has only a limited amount of oxygen to consume. In case of a body of water which is heavily polluted with organic matter, the competition for oxygen becomes extremely keen as the temperature rises. This may be partly cared for if a growth of green plants is available. The green plant increases its consumption of carbon dioxide and puts forth oxygen in greater quantities. Thus the aquatic plant-animal cycle becomes self-regulatory in relation to the temperature.

Sausalito has recently seen the water purification by means of green plants in operation. The dumpage from the distillery on Richardson's bay had thrown so much organic matter into the waters that the oxygen in the vicinity of the dumpage was reduced to one-third its original value. No minnows or fish of any description could be found in the polluted area. Just across from the distillery near Strawberry Point, a huge green growth sprang up. This was termed "Emerald Isle" by the natives. On a warm day this green growth supersaturated all the surrounding waters with oxygen. There was an excess of one hundred per cent while the waters in the immediate region had only one-third the normal amount. In this highly oxygenated water were huge schools of minnows. Later reports showed fine catches of bass in the same water. If no more organic matter is dumped the water may eventually all be purified by the joint action of the several agencies. If the organic dumpage continues the carbon dioxide may be too high for the aquatic plant life so that it can not exist and this very important oxygenating agent will no longer function.

An interesting question in relation to the oxygen demand of fishes must be the experiences of the migratory fish. Since fresh water at the same temperature holds twenty per cent more oxygen than sea water, the salmon, as he migrates up a stream to spawn, must get all the sensations of the tourist who climbs a high mountain from sea level.

Numerous problems of far-reaching importance may lie in the path of the student of the fish and the oxygen he breathes. Little is known of the effects of oxygen upon migrations. Fish may turn from concentrations of oxygen which are so slight a chemical means can not detect them. This is of importance in relation to the effect of sewers

and industrial organic wastes upon fisheries whose interests are directly concerned with fish migration.

Little data is available for the managers of aquaria and fish hatcheries in regard to the oxygen demand of different species in the various stages of their life cycle. Enormous practical benefits must result from the thorough study of the fish and his oxygen requirement in all stages of his existence.

EDUCATING THE VACATIONING PUBLIC.

By Harold C. Bryant.

Eight years ago some lectures and field trips given in Yosemite proved that people on their summer vacations were anxious to study wild life and hear of the need for conserving it. The following year definite educational work in the state's summer resorts was started by the Fish and Game Commission in the Tahoe region. At the request of the Director of National Parks the work was transferred to Yosemite National Park the following year and here it has developed amazingly. So successful was the demonstration of what could be done along educational lines that a similar program has been developed in other national parks. Where originally a few thousand heard lectures or followed a nature guide on a field trip many thousands now attend the lectures and campfire talks and thousands rather than hundreds learn of nature first hand under trained leadership. The enlarged program is authorized and financed by the National Park Service.

From the standpoint of accomplishment there are three things that stand out as a result of last summer's activities of the Yosemite Nature Guide Service: a training school for nature guides and teachers; extension of the program to back country camps and increased interest and attendance.

Twenty students enrolled in the Yosemite School of Field Natural History. The course included a six weeks study of living forms in their natural environment plus a week's study of conditions at higher elevations. These students have gone back to their occupations filled with worthwhile knowledge of fauna and flora and with new ideas relative to conservation. What they learned will be passed on to the students in their schools and to their friends, thus widening the field of endeavor. In this group will also be found trained men and women capable of starting similar educational work in other summer resorts another year. A special campfire with natural history lore as a special attraction was another innovation.

It was possible this year to place a nature guide at two outpost stations—Glacier Point and Tuolumne Meadows—thus giving equal opportunities to those staying at back country camps. Though numbers handled were smaller at these outposts, compensation was to be found in the more intimate contact and the notable enthusiasm. At the higher elevations mammal life is more abundant and opportunities for study of the more unusual forms more frequent. Angling conditions being better, a study of fish life and protective measures necessarily became easier.

A review of statistics shows the following totals:

	Number	Attendance
Lectures and campfire talks	303	49,470
Field trips	494	9,912

These totals are in addition to the attendance at the museum and flower shows where opportunity is given for questions relative to fish, game and other life. Add these figures and the number of persons considerably exceeds the 100,000 mark.

When it comes to fundamental educational work bearing on conservation and the work of a Fish and Game Commission it would be difficult to find anything more worthwhile than this nature guide work in national parks.

THE 1924 COMMERCIAL CATCH OF FISH IN CALIFORNIA.

By W. L. Scofield.

The total commercial catch of California fish for the calendar year 1924 was but little short of 314 million pounds (or 157,000 tons), an amount exceeding that of any other year in the history of the state. The post-war slump in the fishing industry was most apparent in 1921, but since that time there has been a steady and rapid increase in the total catch. (See figure No. 39.) Of the 1924 catch, over 7 per cent were sardines delivered to the canning plants of Monterey, San Diego and in the neighborhood of San Pedro. In other words, the amount of sardines landed last year was about three and one-half times that of all other species of fish combined. In 1924 the sardine catch was more than half again as large as that of the preceeding year and a little over five times that of 1921.

An examination of figure No. 39 reveals the interesting fact that the sardine catch is largely responsible for the great fluctuation in *total* catch during the last nine years. The sardine catch has varied greatly from year to year while the take of other species of fish has remained much more uniform. In noting the variation in total catch we are apt to assume that the various fisheries of the state have decided fluctuations, but as a matter of fact most of the fisheries are fairly stable and the extreme ups and downs are to be found in the take of cannery fish. Although albacore and other tunas are packed in relatively small quantities, the great bulk of the fish utilized for canning consists of sardines. The sardine catch depends very largely on general economic conditions, chiefly the sale price on the open market of case goods and by-products, whereas the catch of most other species is more apt to be determined by local demand which evidently is fairly uniform from year to year.

By referring to figure No. 39, it will be seen that the catch of fish, other than sardines, has remained fairly close to the 84 million pound mark which is the average catch for the last nine years. During the three years 1917–1919 the catch was somewhat above this average but this was the period when there was a campaign to induce people to eat more fish and when the prices of other food stuffs increased much more than fish prices. We often refer to the 1921 post-war

slump in the total catch of fish, but the species other than sardines did not slump greatly and have remained near the 1916 and 1921 marks up to the present. This suggests the possibility that the normal catch for delivery to fresh fish markets and for packing by other methods than canning is about that of the last four years, and that the catch of the four years 1917–1920 was abnormally high. It might be that the average annual catch of fish other than sardines, if taken over a greater period of years, would be found to be less than the

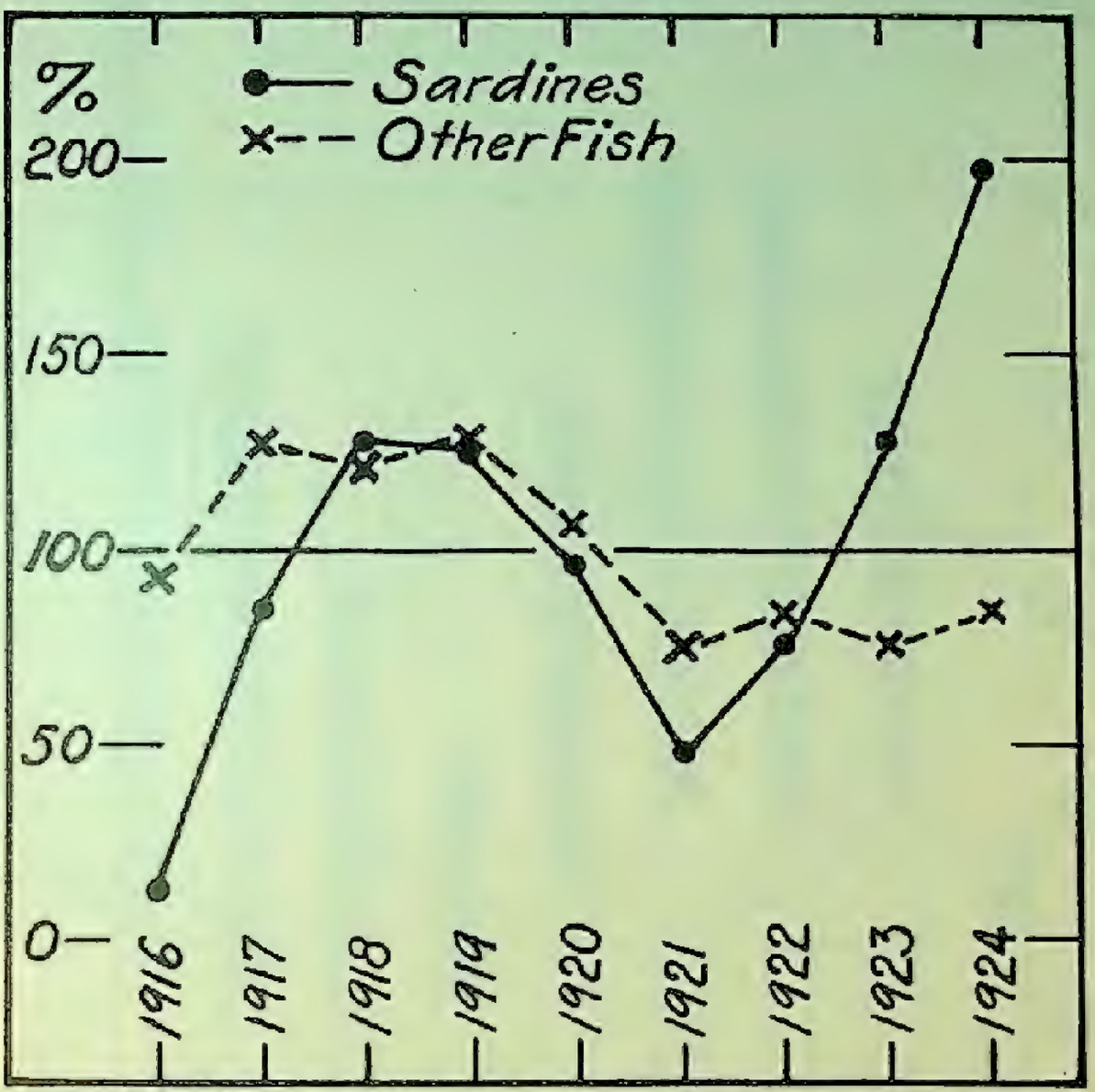

FIG. 39. The commercial catch of fish landed in California each year for the nine years 1916–1924.

average for the last nine years, yet one would expect a gradual increase in fresh fish consumption with the increase in the population of California. At any rate the average catch of fish other than sardines for the last four years (1921–1924) is only two-thirds the average of the four preceding years (1917–1920) and is slightly less than in 1916. Whatever may be considered as the normal catch for a greater period of years, it is evident that there has been no material increase in the catch of fish other than sardines since the low mark of 1921.

Figure 40 was prepared to illustrate the fluctuations in the sardine catch contrasted with the catch of all other fish. In each case the average catch of the last nine years was assumed to be the normal and plotted as 100 per cent while the catch of each year was plotted as

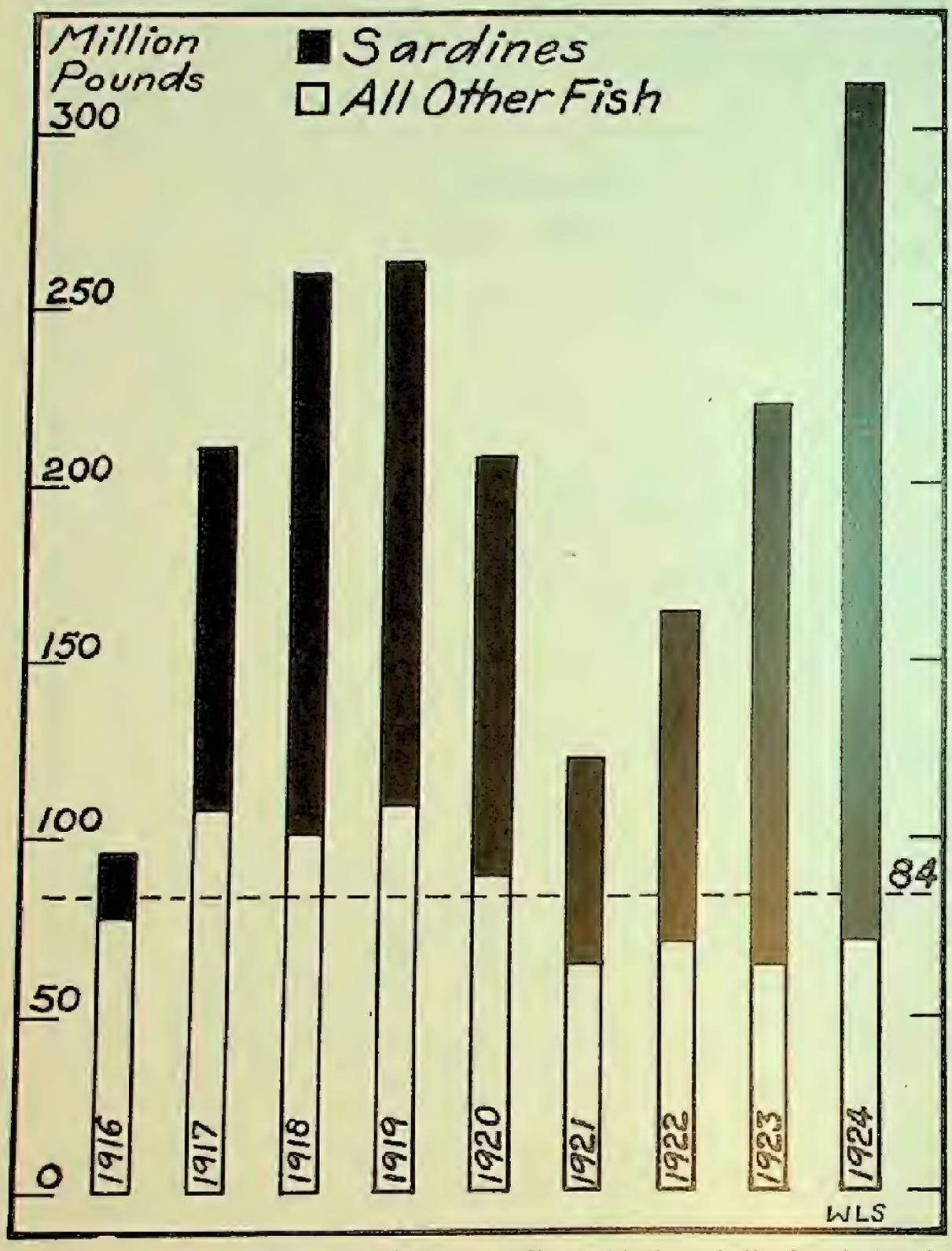

FIG. 40. Contrasting the annual catch of sardines with that of all other California fish, each catch plotted as a percentage of the average over the nine-year period 1916–1924.

a percentage showing its relation to the average. This is a striking illustration of the fact that sardine catches have fluctuated violently

from year to year, whereas the combined catches of other species have remained more constant. It is also evident that the sardine catch suffered a slump in 1921 relatively greater than that of the other species, and likewise has experienced a quicker recovery and more rapid increase since 1921.

In figures Nos. 39 and 40 and in the discussion so far, one species has been contrasted with the combined catches of other species. This method is open to the objection that some other species may have experienced even more decided fluctuations in catch than sardines, only to be obscured in the process of combining with other more stable species or with catches that fluctuated in the opposite direction. For this reason the percentage increase or decrease in the catch was calculated for the other important species, that is, for albacore, flatfish,

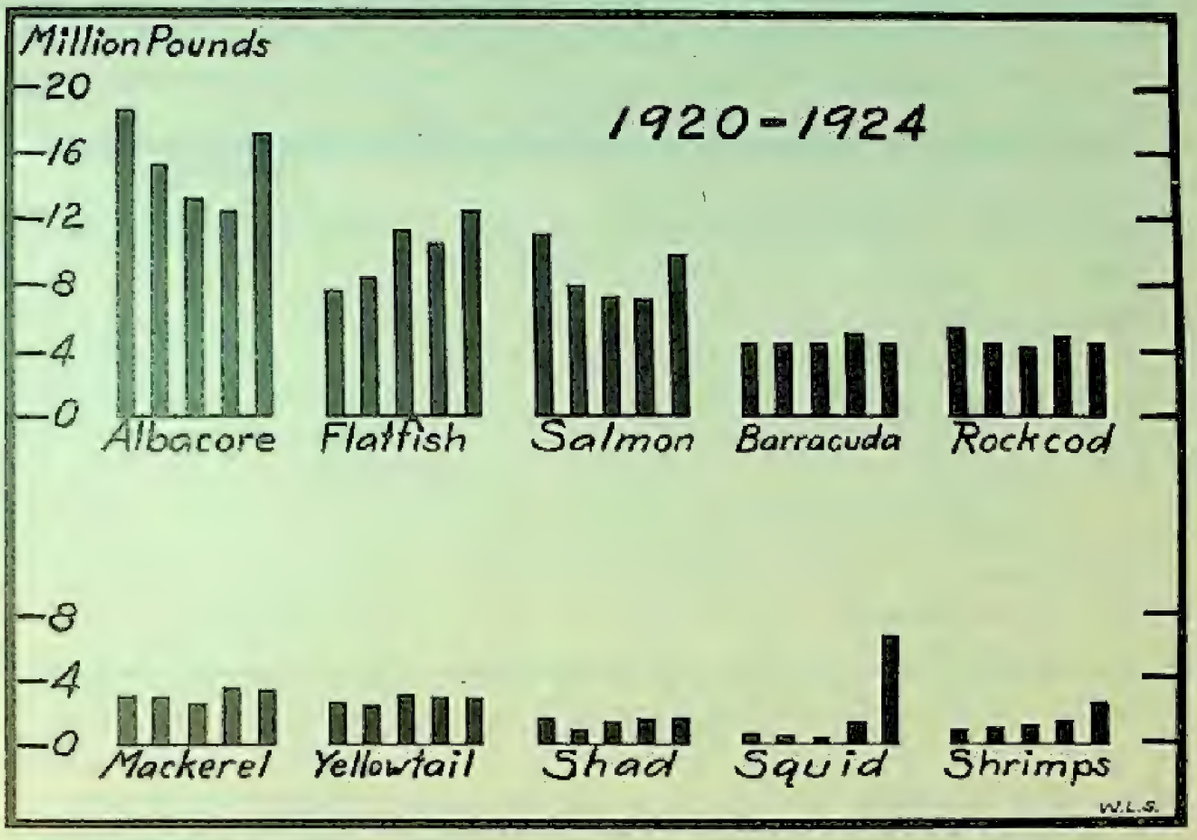

FIG. 41. The California commercial catch of several species, each year's catch represented by a separate bar for the five years 1920–1924 reading from left to right.

salmon, barracuda, rock cod, and mackerel for the last five years, and it was found that none of these catches showed a fluctuation from year to year at all comparable with the great jumps in the sardine catch. These other species of fish individually fluctuated over an extreme range of from 75 per cent to 125 per cent in some cases, whereas the sardine catch climbed from 44 per cent to 180 per cent of the average during the same five-year period, and as will be seen in figure No. 40, the sardine range for the nine-year period was from 13 per cent to 198 per cent of the nine-year average.

Figure No. 41 was prepared for the sake of comparing the catches from year to year of a few of the more important or interesting species for the last five years. Albacore and salmon show a decline during the first four years of this period, but each shows a decided increase in

the catch for 1924. The catch of flatfishes (here used to include halibut, flounders, sole and sandabs) seems to be increasing while the take of the other species of fish remains fairly constant. Rock cod as here used includes the rockfish, boccaccio, chilipepper, and bluefish of Monterey as they are all of the genus *Sebastodes;* but the figures are not strictly accurate because of the confusion in the use of common names.

In figure No. 41 squid and shrimps have been represented although they are not to be considered as fish, and are not included in any of the fish catch totals here presented. The squid is listed as a mollusk, but in outward appearance it resembles a fish rather than a shellfish, and in commercial importance it is worthy of at least honorable mention. The large squid catch of 1919 was followed by four years of small catch and then in 1924 there was such an increase that squid gained the rank of fifth place in the number of pounds landed. The

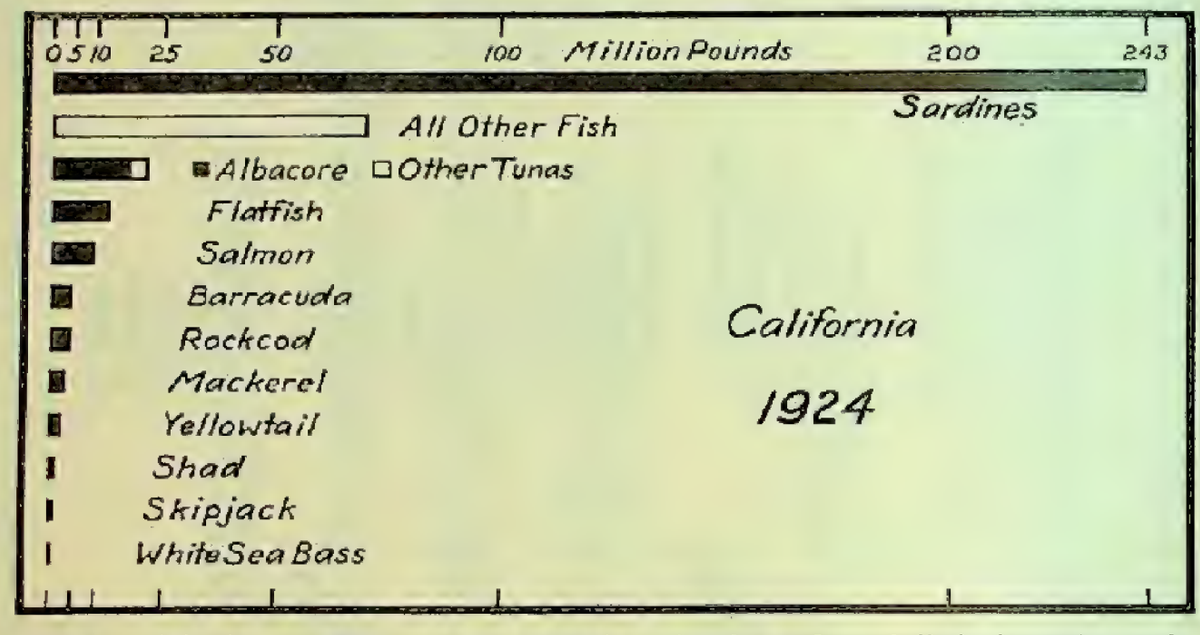

FIG. 42. Eleven commercial fishes arranged in the order of their importance in the California catch of 1924.

1924 catch of squid was about seven-tenths that of the salmon, about one-half times greater than the take of barracuda, and was considerably more than one and one-half times greater than the catch of all tunas exclusive of albacore. Last year squid exceeded the combined catches of yellowtail, skipjack, white sea bass, and halibut.

As already stated, the 1924 sardine catch was about three and one-half times greater than the combined catch of all other species of fish, and this one year's sardine catch far exceeded the total catch of all other species for the three years 1922, 1923 and 1924 combined. The huge preponderance of the sardine catch is best realized by comparing it with the take of other individual species of fish. We are in the habit of thinking of salmon as one of the most important fish in California and yet last year's sardine catch was more than five times greater than the combined salmon catches of the last five years. Last year sardines outranked salmon almost 25 to 1. The catch of albacore ranks

second to sardines in amounts landed from California waters, and yet the 1924 sardine catch was about 14 times greater that that of albacore.

Figure No. 42 represents the 1924 landings of eleven of the more important species or groups of commercial fishes in California, and shows the relative importance of the principal groups. It will be seen that the catch of flatfishes is not far behind that of albacore and that salmon occupies fifth place in this scale. The shad here included is not a native son, being transplanted from the Atlantic coast, but the new surroundings were agreeable to the extent that we now carry coals to Newcastle by shipping this fish each year to the Atlantic states, where a planked shad is treated with a respect but little short of reverence. Irreverant Californians are less appreciative of the shad. We also fail to appreciate fully the fact that our great stretch of sea coast produces not only an abundance of excellent food fish but that there is a remarkable variety in the kinds of fish landed at all seasons of the year.

GOVERNMENT REPORT ON SUGGESTION THAT BAG-LIMITS BE REDUCED.

The following report was recently issued by the United States Department of Agriculture. The Department has been urged to bring about an immediate reduction of the daily bag-limits on wild ducks and wild geese, it being contended that wild fowl have been greatly reduced in numbers and the future safety of the species will be in grave danger unless the daily bag-limits are greatly reduced immediately.

The Biological Survey, which already had a large volume of material concerning the abundance of wild fowl, instituted a nation-wide investigation, and through the medium of a questionnaire sent to state game commissioners, sportsmen, conservationists and conservation societies, many of the Department's field representatives, and others, and also published in many sportsmen's magazines and periodicals, secured further valuable information on the subject. The data gathered came from practically every section of the country and indicates quite conclusively, the Department believes, that wild ducks and geese have shown a very marked and gratifying increase since they have been afforded federal protection, and trained observers assert that the increase ranges from 10 per cent in some sections to over 200 per cent in other localities. With very few exceptions, the heads of the state game departments assert that the birds have greatly inceased in numbers and even in those few states, some observers contend that the birds have increased rather than decreased.

It is no doubt true that the absence of water or food or both, in some sections has, at times, caused the birds to pass up those places temporarily, but the mass of data acquired by the Biological Survey indicated, the Department believes, quite conclusively that there are in the country more wild ducks and geese that we have had for many years.

The federal bag-limits of 25 ducks and 8 geese a day is merely intended as a maximum for bag-limits throughout the United States. A clause in the Migratory Bird Treaty Act specifically provides that the states may afford additional protection to migratory birds through reduced bag-limits, or by imposing other restrictions, at any time, and action by the states is not in any way dependent on action by the Department.

Twenty-four states have enacted legislation establishing daily bag-limits smaller than those prescribed by the federal regulations, and many states have made other restrictions to afford additional protection to the birds. In this connection the Department feels it would not be justified in reducing the federal bag-limits on wild ducks and geese at this time, but it is of the opinion that it might be advantageous to adopt the suggested amendment which would make it a federal offense to hunt or kill migratory birds at times, in numbers, or by methods prohibited by state law, and it will be appreciated if you will have the members of the advisory board give the Department the benefit of their views on the advisability of adopting such amendments.

The present federal regulations, considered to be liberal, are being flagrantly violated in many sections, and we are unable adequately to cope with the situation because of our small warden force and limited appropriation. The Department feels that a greatly reduced federal bag-limit at this time would serve only to aggravate conditions and incite increased violations, and withal, tend to alienate much of the favorable sentiment that now exists throughout the country in favor of the regulations. Furthermore, the Department is of the opinion, by reason of the marked increase in wild fowl, that immediate radical reductions in bag-limits are not necessary at the present time throughout the country. Conditions require, more than anything else, a substantial increase in the federal warden force and the saving from destruction by drainage of the important remaining wild-fowl breeding-, feeding-, and resting-places.

CALIFORNIA FISH AND GAME

A publication devoted to the conservation of wild life and published quarterly by the California State Fish and Game Commission.

Sent free to citizens of the State of California. Offered in exchange for ornithological, mammalogical and similar periodicals.

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All material for publication should be sent to H. C. Bryant, Museum of Vertebrate Zoology, Berkeley, Cal.

March 10, 1926.

The greatest problem in connection with wild bird conservation today is the provision of an effective system of education on a scale greater than any hitherto attempted and enlisting the assistance of all available agencies, including the press, the screen, and the radio.—Policy of the Outdoor Recreation Conference.

YOUR PATIENCE REQUESTED.

Considerable reorganization, looking toward efficiency, is being planned within the various departments of the Fish and Game Commission. Pending readjustments it has been impossible to issue this October number of CALIFORNIA FISH AND GAME, which is now before you.

A CORRECTION.

In this column in our last edition several mistakes of fact were made which the editor hastens to correct.

No attempt was made at the last legislative session to take any money from the fish and game fund and put it in the general fund. H. R. Braden of the Board of Control stated publicly in the Assembly Chamber before the joint legislative budget committee that all fees would be expended for fish and game protection and that the Governor supported this position.

The Fish and Game Commission and the editor of this bulletin commend the Governor for his support of the Commission. His reasons for vetoing the increase in fish and game fees were sound.

The Governor's statement made at the time of the veto was most convincing. He said: "The Fish and Game Commission has, under the economy plan of my administration, built up a surplus of $301,802.86 and will have in the budget $1,348,660, making a total of $1,650,462.86 which is all the money that can be properly spent in the next two years. This is $233,000 more than any previous biennial appropriation. The budget provides for fish hatcheries, equipment, fish distribution, game farm buildings, launches, game wardens and other items.

"It is the duty of every police officer and every sheriff and constable and their deputies to apprehend law violators. The enforcement of law and the prosecution of law violators is a county and city function and not a state function.

"The demand for an increased license comes from an evident misapprehension of the law and of the Commission's finances. After a careful canvass I am convinced that the great majority of the people who hunt and fish feel the present tax is sufficient. The average citizen who pays a license and gets neither fish nor game, as is usually the case, feels that the present tax is too high. I fully sympathize with the majority as I have for years been paying the license without tangible results."

In connection with the above statement it will be interesting to note that the hatchery foremen have been increased from 13 to 18; the permanent hatchery assistants from 16 to 25; the temporary hatchery assistants from 32 to 40; deputies from 83 to 90; the seine helpers from 8 to 10, a total increase from 188 employees two years ago, 210 last year and 233 employees for the coming year. The traveling allowance for deputies and wardens was increased from $91,000 to $100,000 per year. The amount for fish hatcheries was increased from $19,000 last year to $35,000 this year. The amount for fish hatchery equipment was increased from $500 to $13,250, this year; and an additional appropriation of $25,000 was made for fish distribution equipment, while $50,000 has been appropriated for game farm buildings and equipment.

STATE FAIR EXHIBIT.

As in past years the beautiful panorama at the north end of the Horticultural Building installed by the Fish and Game Commission attracted enormous crowds at the State Fair in September. Trout and freshwater fish of many varieties were to be found in aquaria. Live adult pheasants, young pheasants with the foster mother, Hungarian partridges, mountain and valley quail were exhibited for the first time in many years. As usual the changing lights on the panorama were the subject of much favorable comment. By no other means is the Com-

mission's work so effectively advertised as by this splendid exhibit at the State Fair.

EFFICIENCY IN ADMINISTRATION.

Originally conservation work in California was in the hands of a chief warden, a fishculturist and a few scattered deputies. This small organization operated smoothly. A roster of employees of the Fish and Game Commission now shows a staff of 233. There are four main departments, three division offices, and eighty deputies widely distributed. To keep this large organization functioning efficiently is not an easy matter. That the various units may know their responsibilities Commissioner Zellerbach has had an organization chart prepared which indicates responsibility. This graphic illustration of the intricate ramifications of the work should awaken employees to the magnitude of present day operations, and at the same time show the earnest endeavor being made to increase efficiency of administration.

FISH FOR FERTILIZER.

It has been the custom in many of the fish packing plants to utilize a large part of the catch of sardines for the manufacture of oils and fertilizer. The Fish and Game Commission has been opposed to this practice and at the last session of the legislature succeeded in having a bill passed which restricts the fish packing plants to the use of not more than 25 per cent of their capacity during the packing season to be devoted to the manufacture of oils and fertilizer. The Commission was actuated by the desire to conserve this edible fish. Experience has shown that fisheries have been depleted even when the product is used solely for food. The North Sea and the waters surrounding Denmark have at least during the last fifty years furnished more food fish than any other known place in the world and now it is officially published in newspapers that the flounders

FIG. 43. A Fish and Game Commission Deputy on winter patrol. In mountain districts a return to this sort of transportation is necessary.

and the sole are practically exterminated. We do not have to go very far north of our own wonderful state to see what is happening in the salmon industry. Formerly fish canners made the manufacture of oil and fertilizer the principal part of their business and the canning of fish was merely a by-product. It is certainly a wise policy to make the canning of this edible fish the principal business of the packers. If the fish business were to go on as in the past, there would be grave danger of depleting the supply of sardines.

Commissioner I. Zellerbach is quoted as saying: "The Fish and Game Commission was established to conserve fish and game. Certain packers get their raw material free except for the expense of catching fish; consequently, there must be regulations to conserve this edible product for the future generations. Fish, primarily, must be kept for food purposes and the fertilizing end of the packing business must be the small end.

"The Commissioners have asked cooperation from the packers and have served due notice that there is to be rigid enforcement of laws governing the industry. Violations will be prosecuted without fear or favor."

FIG. 44. Mount Shasta Hatchery, largest and most productive of California's many hatcheries.

DOLLAR-A-YEAR DEPUTIES.

Decision has been made to appoint a limited number of dollar-a-year deputies as a means of securing better law enforcement. Each appointee must secure the endorsement of a well established fish and game protective association, and the association must pay the premium on compensation insurance for the deputy. On such recommendation the Commission will make a formal appointment. The men appointed will work under the supervision of the department of patrol and will have full power to make arrests for violations of the fish and game laws.

The following opinion of the legality of such appointments was recently secured from the attorney general:

State of California
Office of Attorney General
San Francisco, August 8, 1925.

Hon. George Neale,
Executive Officer,
Fish and Game Commission,
Sacramento, California.

Dear Sir:

I have your communication of August 1st in which you request an opinion under the existing law, on the following points:

1. Is there any authority under Section 642, of the Political Code, or otherwise for the Board to appoint special deputies, for assistants, without pay?

2. Is the State of California, or the Board of Fish and Game Commissioners as a Board, or as individuals, liable for injuries received by such special deputy or assistant, while making an arrest or seizure under the Fish and Game Laws of this state, under either the Workmen's Compensation Act, or otherwise?

Section 642 of the Political Code provides in subdivision one thereof in part as follows: that the Fish and Game Commissioners may from time to time employ such assistants as they shall consider necessary, which persons shall be public officers.

It is to be noted that the statute uses the word "employ" and not appoint. Under the generally accepted definitions of the word "employ" it implies a contract of employment and compensation (Words and Phrases, Vol. II, page 260).

Subdivision one of section 642, aforesaid, further provides in part as follows:

"The fish and game commissioners, or their regular salaried deputies or assistants, shall inspect all buildings, other than dwellings, and all receptacles, other than the clothing actually worn by a person at the time of inspection, where game or fish may be stored or placed, and all boxes and packages containing fish or game that are held for transportation by any transportation company or common carrier, and it shall be the duty of the fish and game commissioners, or their regular salaried deputies or assistants, to inspect regularly all boats, markets, stores, and other buildings, except dwellings, where game or fish is held for sale or storage, and all boxes and packages containing fish or game that are held for transportation by any transportation company or common carrier."

It is apparent from reading this portion of the same section that the only persons authorized to inspect buildings and receptacles where fish and game may be stored and boxes and packages containing fish or game held for transportation, are the fish and game commissioners, or their *regular salaried* deputies or assistants. It is to be noted that it is further made the duty of the fish and game commissioners and their regular salaried deputies or assistants to inspect regularly boats, markets, stores and buildings other than dwellings where game or fish is held for sale or storage or all boxes or packages containing fish or game held for transportation. You will note that the persons invested with the authority and upon whom the duties are imposed are regular salaried deputies or assistants. There is no provision in the law conferring authority to make such inspections or to perform such duties upon deputies or assistants serving *without pay.*

The law specifically provides who are authorized to make the inspections and who are subject to the impositions of the duties of the statute and where a statute specifically designates the persons who shall be invested with such authority such designation necessarily implies the exclusion from the authorization in the statute of persons not specifically mentioned.

While it is true that the first portion of the section in question does not specifically state that the assistants shall be salaried it does state that they shall be *employed* and not appointed and a reading of the latter portion of the section which gives authority to make inspections only to regular salaried deputies leads to the conclusion that the proper construction of the statute is that there is no authority therein for the board to appoint special deputies or assistants without pay to enforce the provisions of the act.

In view of this construction of the statute it becomes unnecessary to consider the second question you propound for quite obvious reasons.

Yours very truly,
U. S. WEBB, Attorney General.
By Charles A. Wetmore, Jr.,
Deputy.

CALIFORNIA'S FISH AND GAME.

A leaflet with the title "California's Fish and Game" illustrated in color with lithographs of various fish and upland game birds was handed visitors to the Commission's exhibit at the State Fair. This attractive leaflet outlines the history of the Fish and Game Commission and the accomplishments in the line of fish-culture. The following quotations give an idea of the interesting text but the leaflet with its beautiful colored pictures tells still more:

"The angler's license gives the holder the privilege of fishing in 26,000 miles of mountain streams, in which native and foreign trout have been introduced, beside 1200 miles of coastwise fishing including the interior rivers and bays of the State of California. The hunting privilege gives him practically 153,000 square miles of land area on which to hunt our native game birds and mammals.

"The Fish and Game Commission is a self-supporting agency. Not one cent comes from the taxpayer. Any person may partake of the privilege of hunting and fishing for the small fee exacted and which is the least amount any state demands for a like privilege. The returns from the amount paid are many times in excess of the small fee demanded.

California Statistical Information.

"Land area, 153,650 square miles; length of fishing streams, 26,000 miles; area of fresh water lakes, 862,000 acres; number of deputies in field, 80. With the above figures as a basis, a little figuring will show you that one California deputy has as his beat the following: 1,228,800 acres of land, 325 miles of fishing streams, 10,775 acres of fresh water lakes, 15 miles of coast line. Can he do it efficiently? Can 80 men keep a check on about 100,000 fishermen and hunters and more than 1,000,000 automobiles? The deputy not only protects game birds, fish, and animals, but also song birds, insectivorous birds, and the birds beneficial to the farmer, the birds enjoyed by the nature lover, and the camera fan—and this without any expense to those classes.

Hatchery Statistics.

"Total trout distribution since 1872, 2,000,000,000; length of present distribution car, 65 feet; capacity of present distribution car, 300,000 fry; total distribution to date would require a train in length 58,861 miles (this would more than twice encircle the globe); trout distribution in 1872, 28,000 fry; trout distribution in 1925, 32,104,000 fry."

5000 PHEASANTS DISTRIBUTED.

In answer to the demand by sportsmen for the introduction of game birds the Fish and Game Commission purchased 5000 ring-necked pheasants from the Ahtanum and Riverside game farms, Yakima, Washington, and has been distributing them in suitable localities in central and southern California. Mr. E. H. Lewis, a skilled game farmer, who

reared them personally superintended the planting. A shipment of 3000 birds went to Inyo County where pheasants have thrived. The Rainbow Club, a strong organization of 1500 sportsmen, of Inyo and Mono counties saw to it that the birds were placed in protected areas where they would thrive. Even though the birds had been in small cages for nearly a week they stood the trip well and seemed strong and vigorous. After the cages had been opened some of the birds flew a hundred yards to find suitable cover.

Another shipment of 1300 birds went to San Diego County for planting by the San Diego County Fish and Game Protective Association. Eight ranches in various parts of the county were selected as distributing points. In some instances the birds were held for a few days until they became accustomed to their new environment.

The Stanislaus-Tuolumne Fish and Game Protective Association received 250 birds for planting and augmented this number with fifty more purchased from the Hayward Pheasantry, a local game farm. Careful precautions were taken by Modesto sportsmen to see that the birds were properly released. The crates were placed along a drainage ditch close to heavy cover. Previous to this scratch feed was scattered for some distance around, thus furnishing a temporary source of food. As a further precaution the 4000 acres near Keyes is being posted and a deputy sheriff has been appointed to prevent trespassing.

This is the first plant of upland game birds by the Commission since the State Game Farm at Hayward was abandoned in 1918. When plans for the new game farm near Napa have matured plantings such as this will be of common occurrence.

The eggs required to fulfill the contract were shipped into Yakima Valley from various game farms in Washington, Oregon and British Columbia. Domestic hens were used as foster mothers, twenty eggs being set under each hen. Many hens hatched from sixteen to eighteen baby pheasants. After hatching each hen and her family were liberated in a small pen. Later they were moved to field coops in alfalfa fields or along the banks of irrigation ditches. The first feedings consisted of a carefully concocted mixture of egg, custard, liver, cottage cheese, patent pheasant food and lettuce with grain gradually added and the egg reduced. At first four feeds were given daily. About five months was needed to sufficiently mature the birds.

The pheasants were shipped to Cali-

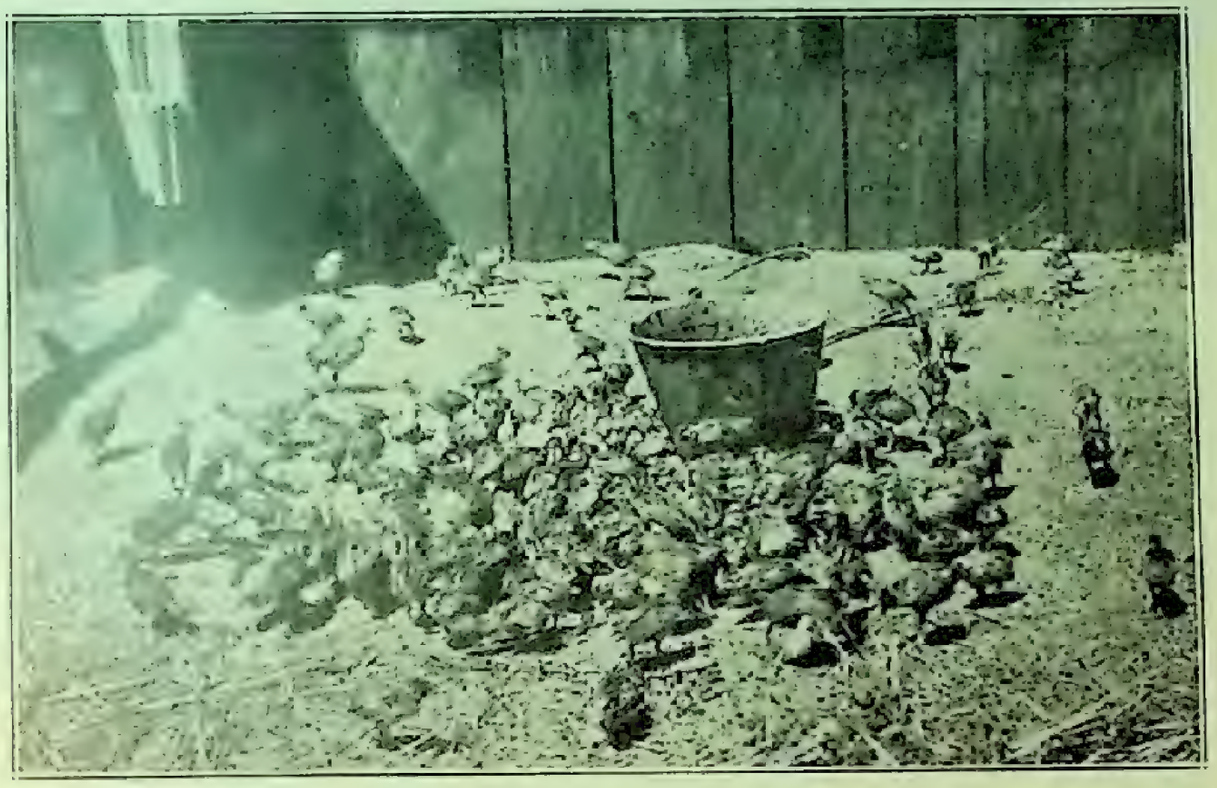

FIG. 15. Young ring-necked pheasants, State Game Farm, Hayward, 1916. Photograph by Wm. Dirks.

fornia in special crates allowing easy insertion of food and water. The mother domestic hens were shipped with the young pheasants.

HATCHERIES TO BE REPAIRED.

The Fish and Game Commission, in planning to more efficiently carry on the work delegated to it, is contemplating extensive repairs to various hatcheries. Mount Shasta Hatchery is to receive most attention. Several of the egg-collecting stations on the Klamath River need concrete piers, and several hatcheries need rearing ponds. An initial appropriation for the establishment of the proposed game farm has been made and a splendid site selected. The Department of Commercial Fisheries has for many years been in need of a patrol boat for the northern coast, and in the near future must have an added force of deputies to enforce laws relating to reduction and canning. The Commission has asked a deficiency appropriation to cover these needs.

FISH RESCUE WORK NEEDED.

The request for 20,000 black bass for stocking lakes in Golden Gate Park has again brought up the question of a supply of these fishes for use in stocking reservoirs and lakes. There are several hundred similar applications. None of the bass are propagated in hatcheries. The only supply at present is to be secured from overflowed areas, or from lower reaches of streams. With so great a demand it would seem reasonable that the Commission should establish certain rearing ponds for these fishes so that these requests may be met. Such rearing ponds might readily be restocked by a fish-rescue crew, who by a few months work could secure plenty of small fish for stocking the ponds. There are many bass which are black bass, and crop could be placed to good advantage, thus improving the fishing conditions and shifting interest from trout, which are being overfished.

IN MEMORIAM.

GEORGE H. ANDERSON,

Fish and Game Commissioner, December 12, 1922–May 11, 1925.

George H. Anderson died at his home near San Juan, Santa Clara County, on September 13, 1925, leaving a brother, Alden Anderson, president of the Capital National Bank of Sacramento, and a wife and three children to mourn his loss.

Always a lover of the outdoors and of sport Mr. Anderson took a prominent part in conservation measures. When in the legislature in 1901 he fathered the first non-sale law on game. In December, 1922, he was appointed Fish and Game Commissioner and served with devotion until May 11, 1925. As a trap shooter and sportsman he was widely known. He built up an enviable reputation as an orchardist interested in pear growing and as a business man in San Jose. From men like George Anderson comes inspiration as well as action. True sportsmanship and all that goes with it has lost an enthusiast whose place will be hard to fill.

CONSERVATION OF THE YOUNG.

Everywhere in nature death takes a large toll among the young. Originally we estimated increase on the basis of eggs laid. Now we follow the motto "Don't count your birds before they hatch." If we keep track of a number of birds' nests we discover that a goodly proportion are destroyed, not by some particular enemy but as a result of several different agencies. Keep track of ducks' nests in a marsh and many are raided before the eggs are hatched, especially if the water level drops, allowing easy approach. The Biological Survey in their investigations on bob-white quail in Georgia discovered 60 to 75 per cent of the nests in which eggs were laid were destroyed. Enemies enumerated number eight. Upland game birds lay enough eggs to withstand ordinary toll but introduce additional enemies like the house cat and the opossum and the birth rate may drop below the death rate. Under such circumstances there is little hope of survival. There is much talk but little action relative to introduced enemies which have far greater direct bearing on abundance than do natural enemies. In predatory animal control let's begin with the undesirables first!

HUNTING RIGHTS.

In endless ways Americans have defended their legal right to hunt and fish. Courts have continually upheld the thesis that fish and game is a resource of the commonwealth. Public sentiment has prevented the utilization of streams as private preserves. There is continual clamor for public shooting grounds to replace territory where trespass laws are enforced. The latest display of similar sentiment is to be found in Assembly Con-

current Resolution No. 19 introduced by Mr. McPherson, passed by both houses and filed with the Secretary of State. It reads as follows:

Assembly Concurrent Resolution No. 19—Relative to the policy and practice of renting or leasing the exclusive right to hunt wild game or game birds on state lands, by-passes, drainage, levee, or protection districts or other properties of this state to persons, clubs or corporations.

WHEREAS, It is of public interest to preserve the exclusive right to hunt wild game or game birds on state lands and other properties under the control and jurisdiction of the State of California, in the interest of the people of this state; and

WHEREAS, The practice of leasing such privileges by any department or agency of this state to persons, clubs or corporations is not in accord with the established principle that the ownership of the wild game of this state is vested in the people and held in trust by the state for the benefit of all the people; now, therefore, be it

Resolved by the assembly, the senate concurring, That said rights of the citizens of the state to hunt on the public lands of the state should be preserved by the several departments or agencies of this state to the end that all citizens shall have the same and equal right to hunt on such lands.

MODESTO JUDGE AIDS GAME PROTECTION.

As evidence of the constructive game conservation work that can be accomplished by a judge we cite Judge W. H. Rice of Modesto. The local fish and game protective association has just planted several hundred pheasants in an attempt to better hunting conditions in the district. When Deputy Briggs brought in a hunter having three quail and a cottontail in his possession taken during close season the judge fined the offender $100, which meant $25 per bird, and then gave out this statement:

"I am going to do everything in my power to stop the shooting of game birds out of season. From now on I shall fine everybody guilty of such an offense at the rate of $25 per bird for each game bird killed out of season. Furthermore, if anyone who has shot a pheasant is brought before me I shall give him the maximum fine of $500."

When such a stand is taken the violator thinks twice before violating the law. We need more judges who will take the stand taken by Judge Rice of Modesto.

75,000 FISH SAVED.

In a state like California where there are marked changes in water level, fish life is subjected to vicissitudes every year and to grave dangers in years of drought. Practically every year reports reach the Commission of trout dying in large numbers because of low water. The past month it was necessary to send a crew of men to rescue fish in Soda Creek in Mendocino County. Deputy Dondero and two men after several days of work succeeded in rescuing about 75,000 steelhead trout, 2–3½ inches long, which were stranded in pools, fast drying up. Such a saving of fish is certainly worth while. Similar savings could be made in all similar instances if funds were available for the establishment of a fish rescue department. Such a department would much more than pay for itself by the fish saved. Now the work is sporadic and inefficient. The cost of raising fish is far greater than that of saving them.

FIRST WESTERN OUTDOOR-LIFE CONFERENCE.

In connection with the Sixth Annual National Sportsmen's and Tourists' Fair held at Spokane, Washington, June 17–18, 1925, there was held a Western Outdoor-life Conference with several nationally known conservationists in attendance.

The stand taken by the conference is expressed in the following resolutions which were passed unanimously:

We, your committee on resolutions, beg leave to report as follows:

1. Whereas, the preservation and the development of the outdoor life in America, the protection both of the wild places and the wild life in its native surroundings is essential to the preservation of the ideals of Americanism, upon which this nation has been built, recognizing that in the interest of the future greatness of this country, generations yet to come are entitled to the privileges enjoyed by the present generation and recognizing the necessity for a constructive conservation policy and a continuity of such policy, now, therefore,

Be it resolved, That this conference recommends the early passage by congress of a measure having for its purpose the establishment of game refuges for migratory wild fowl in suitable areas throughout the United States; that such measures as are necessary be enacted to prohibit unwise and unnecessary drainage of swamp areas; that for the purpose of providing finances to establish and maintain game refuges on such suitable areas that the present sales tax on small arms and ammunition be continued, and that this sum be set aside as a game or conservation fund to be used for the purchase and maintenance of game refuges; that the states in which such refuges are established shall have concurrent jurisdiction over their maintenance.

2. Resolved, That the Western Outdoor-life Conference recommends and strongly urges that the Department of Agriculture exercise its authority at the earliest practical date to bring about a substantial reduction in the federal bag limits on migratory game, and that such reductions be uniform throughout the United States; that the Western Outdoor-life Con-

ference join with established conservation organizations for the purpose of securing the enactment of these necessary regulations and thus prohibit the unnecessary slaughter of wild waterfowl at present permitted under federal regulations in those areas where migratory birds bulk heavily during open seasons.

Respectfully submitted,

RESOLUTIONS COMMITTEE.

PLAYING TAG WITH WHALES.

So much has been learned of late through the banding of birds that it is not surprising to find an attempt being made to tag other animals as a means of discovering facts relative to age and migration. Salmon have had their share of tagging in California. Now comes the news that the Norse naturalist, Dr. Johan Hjort, is marking whales by shooting into them a barbed bolt, attached to which is a metal tag asking anyone who finds the tag to report. Last season seven or eight whales were tagged in this way. Whalers believe that harpoons have been found in whales in the north Pacific which prove that they were harpooned in the Atlantic and vice versa, showing the cosmopolitan travels of these great beasts. Still more dependable data as to migration is to be expected as a result of these tagging experiments of Dr. Hjort.

INTERNATIONAL CONVENTION FOR THE PROTECTION OF BIRDS.

Since 1893 an International Convention for the Protection of Birds has been called every few years in some European country. This year the convention was held in Luxembourg, April 13–16, 1925, inclusive. Many notables were present including the chairman, Dr. T. Gilbert Pearson, president of the National Association of Audubon Societies. International bird treaties in Europe formed the most important subject of discussion. Means of making such treaties more effective claimed first attention. As a result committees were appointed to study the situation and report at the next meeting.

SOMETHING TO SHOOT AT.

Automobile loads of hunters traverse every country roadside in their endeavors to find something to shoot at. If game is scarce they practice on valuable non-game species, law or no law. Our best rodent-destroying hawks suffer most. Often telegraph poles are used for perching where trees are not abundant. Every telegraph pole should be a sanctuary for a bird for no shooting is allowed within a hundred feet of a county road. Close approach is possible because the automobile acts as a blind. Birds which would fly at the approach of a man on foot pay little attention to an auto. We do not allow the use of animal blinds nor do we allow approach to waterfowl in a motor boat. Why should we countenance hunting from an automobile? Anyone too lazy or too greedy to alight from a machine before shooting has little respect for true sportsmanship.

DISCUSS LAKE TAHOE CONDITIONS.

Resort owners at Lake Tahoe have been complaining of fish conditions in and around the lake. A meeting held on September 13th was attended by several representatives of the Fish and Game Commission including President Newbert. The stand taken by officials was that depletion, if evidenced, is due to pollution and obstruction of the Truckee River, to diversion of tributary streams, thus destroying spawning grounds and to former depletion by market fishermen and violators. Judging by statistics egg taking conditions have greatly improved since hatcheries were established on the lake. The Tahoe trout, a lake cutthroat, seldom feeds at the surface and angling is always best near feeding grounds. With the introduction of rainbow trout in recent years improved angling is to be looked for along the shores of the lake.

MILD CURING OF SALMON IN CALIFORNIA.

A bulletin entitled "Mild Curing of Salmon in California" has just been issued by the United States Bureau of Fisheries as Document No. 933. The author is W. L. Scofield, assistant, Department of Commercial Fisheries, California Fish and Game Commission. The Department of Commercial Fisheries determined some years ago to gather data relative to the past and present methods of handling fishery products. Considerable has already been published, and the above is the latest contribution.

The process described in brief, is as follows:

"The salmon are gutted, headed, and the sides split from the backbone. The 'sides' are then scraped or 'slimed' and placed in a chilling bath of salted and iced water. They are then drained, given a coating of dry salt, packed in barrels or 'tierces,' mild brine is added, and the tierce is kept in cold storage for a few weeks. The sides are then taken out, graded, and 'repacked' in tierces, brine added, and the tierces shipped in refrigerator cars. They may then be removed,

washed, given a light smoking, and sold to the retail trade. The 'curing' is accomplished in the first brine (before the repack), the mild cure in brine giving the name to the process in distinction to 'hard' or 'dry' salting, smoking, or kippering."

THE RAINBOW CLUB.

A group of anglers in Inyo County celebrated the fifth anniversary of the founding of the Rainbow Club on May 5. The membership of the club has now reached 750. The club has devoted its energies to the planting of fish and has so gained the respect of county authorities that large sums are appropriated to finance their activities. Inyo County appropriated $1,500 and Mono County allows twenty-five cents per mile for hauling trout fingerlings that are planted in that county. The number of fish distributed during the 1924 season crossed the million and a half mark.

GAME MANAGEMENT.

In an article entitled "Ten New Developments in Game Management" by Aldo Leopold (Bull. Amer. Game Protective Assoc., July, 1925) attention is called to the slowness with which the technique of game production has developed. Agriculture and forestry have advanced rapidly because taught in the schools. Right public attitude, effective game wardens, ample funds, use of voting power—all these are of no avail unless we *know how*. Laws, men, and money without skill will no more grow game on our farms and in our forests than they will grow wheat or white pine saw logs. There has been a growing acceptance of this fact in the last ten years, but lots of people do not know it yet. And we who do know seem singularly slow in building up a technique. The average sportsman is contributing too little to the "know how" of game production. He may be a good woodsman, but he is a poor scientist. He is missing a lot, because acquiring a personal skill in raising as well as hunting game doubles the attractiveness of the sport.

OUTDOOR RECREATION CONFERENCE RESOLUTIONS ON FISH.

The following statement relative to policy was adopted by the first Outdoor Recreation Conference in Washington, May 22–24, 1924:

Whereas, Fisheries and aquatic resources are of very great importance as a source of food supply and as a means of providing health-giving recreation to all classes of citizenry; and

Whereas, these aquatic resources have been dangerously depleted and are further threatened by stream pollution; therefore, be it resolved:

1. That scientific investigation furnishing a sound basis for the administration of all fishery resources be further encouraged by federal, state and private agencies;

2. That propagation, stocking and rescue operations in public and private waters be greatly encouraged and enlarged;

3. That legislation is urgently needed, especially with respect to the uniformity of state laws, boundary waters, and anadromous fishes, such as salmon, striped bass, shad and sturgeon;

4. That federal legislation should be secured stopping the interstate sale and shipment of black bass; and

5. That recognition should be taken of the fact that federal and state appropriations for fisheries work have not kept pace with the growing needs of the country.

SPORTSMEN'S CLUBS AFFILIATE.

A move by sportsmen of San Francisco has resulted in the formation of the Associated Sportsmen's Clubs of California. About twenty organizations have affiliated and the organization is said to number several thousand members. Provision has been made to prevent a board of directors running the whole organization. Each member is to have a say in the affairs of the club. The definite stand taken on law enforcement should be of great help in the attainment of severe sentences for the violator.

VERMONT POLICIES.

In the booklet giving the fish and game laws of Vermont, the Fish and Game Commissioner says:

"The progressive policies having to do with fish and game which should command the support of sportsmen and citizens of Vermont may be summed up as follows:

(*a*) The stimulation of public sentiment toward game law enforcement by local organizations of sportsmen, and participation in the actual work of law enforcement by members of their clubs.

(*b*) A 'part time' deputy system replaced by a full time organization of trained wardens.

(*c*) Persistent stocking of lakes and streams with fish reared in artificial

hatcheries, and the establishment of a special fund for the construction and maintenance of new hatcheries throughout the states.

(*d*) Individual assistance in furthering a policy of closing trout stream head waters and tributaries so as to provide each brook with its own natural hatchery.

(*e*) More attention to game and game birds through protection and winter feeding of our native birds, through artificial propagation, and the establishment of sanctuaries for wild birds.

(*f*) To cultivate the closest sympathy through courtesy and consideration of property rights with the landowner, who is custodian of the state's wild life.

(*g*) To discourage any movement that has for its mainspring the commercialization of sport.

(*h*) To help the citizens of Vermont to realize that the wild life of the state is in the nature of a trust fund bequeathed them by the Almighty, and that each generation is entitled to the surplus, but that none may expend the capital fund lest the next generation of Green Mountain Boys be weaker through the loss of their out-of-door heritage.

"That sport shall not be my only aim—that my reward and lesson shall be in the thrill of the chase and the glory of the heights, and whistle of the stag—in the music of the murmuring stream and the leap of the playing trout— in the gold of the autumn's woods and the whirr of the ruffed grouse—in the beauty and silence of the lonely hills and dells."

LIFE HISTORIES OF NORTH AMERICAN WILD FOWL.

There are three books issued within the last five years which contain dependable information relative to the life histories of wild fowl, and these books should be known to every wild fowl shooter. The first is "The Game Birds of California" by Grinnell, Bryant and Storer, published by the University of California press. The second is the pretentious volume published by Dr. John Phillips entitled "A Natural History of the Ducks." The expense of this volume will doubtless preclude its extensive use, but it should be available at the larger libraries. The third book, the second part of which has just been issued, is entitled "Life Histories of North American Wild Fowl" by Arthur Cleveland Bent and is published by the United States National Museum as Bulletins Nos. 126 and 130. The first part of this work appeared in 1923. The treatment of each species of duck and goose includes discussion of general habits, nesting, eggs, young, plumages, food, use as game and distribution. The text has been carefully compiled from contributions made by many scientists the country over. A series of one hundred and sixty plates illustrate the two parts.

No sportsman need seek far for dependable information on ducks or geese, if he refers to either or all of these three books.

BIRD SANCTUARY DEDICATION.

On April 14, with twenty prominent organizations represented the upper end of Vermont Canyon, Los Angeles, was dedicated as a bird sanctuary. Addresses were given by Mrs. Harriett Williams Myers, Mr. William L. Finley, Mr. Arthur Newton Pack and Mrs. G. H. Schneider. In them credit was given to Mr. Van Griffith, president of the Los Angeles Park Commission, for his assistance in securing this sanctuary. It will be closed to the general public except by special permit, but wild life can be studied through binoculars from the trail above.

FIG. 46. Vermont canyon bird sanctuary within Griffith Park. Dedicated April 14, 1925. Photograph by F. T. Bicknell.

Griffith Park was dedicated as a bird sanctuary June 3, 1920. This new dedication shows the increasing interest in conservation and the steps being taken by the public in fulfilling its responsibility relative to the protection and preserving of natural resources.

G. A. LAWYER RESIGNS AS CHIEF U. S. GAME WARDEN.

George A. Lawyer, who for nearly ten years has been chief United States game warden in the administration of federal laws protecting migratory birds, has tendered his resignation, effective September 15, 1925, and it has been accepted by the Secretary of Agriculture. Mr. Lawyer gave as his reasons for the action that he wished to gratify a long-expressed desire to leave the government service in order to look after private business affairs. He referred to a previous occasion on which he had tendered his resignation for like reason, when he had been persuaded to remain in the service, but now stressed his feeling that after nearly ten years in the work he had devoted as much time to it as should be expected of him. In acknowledging the tender of resignation, Dr. E. W. Nelson, chief of the Biological Survey, expressed his appreciation of the valuable services Mr. Lawyer had rendered, particularly in helping frame federal regulations for the protection of game and other migratory birds and other forms of wild life in the United States and Alaska, and in assisting state game and conservation officials, on their request, to draft new and revised legislation affecting game and other wild life resources. Mr. Lawyer before his connection with the Department of Agriculture had been for several years president of the New York State Fish, Game, and Forest League.

LARGE WILD-LIFE REFUGE BEING ESTABLISHED ON UPPER MISSISSIPPI.

With initial steps under way for the purchase of lands for the creation of the Upper Mississippi River Wild Life and Fish Refuge, provided for by act of congress in June, 1924, the dreams of conservationists who fostered the movement will soon be realized. This refuge, along the upper reaches of the Mississippi, is designed as a feeding and resting place for wild fowl and other migratory birds, and as a natural home for fur animals. In addition, it is established for the preservation of fishes, and of trees, wild flowers, and other native plants.

The Izaak Walton League of America originated the idea of the refuge and urged the passage of the act. This section along the river is one of the many areas needed for the perpetuation of migratory game birds and the many other forms of wild life.

The Secretary of Agriculture has been given authority to purchase the lands for the new refuge and administration is through the Bureau of Biological Survey, which maintains many of the other wild-life refuges of the federal government. Jurisdiction of the Department of Agriculture within the refuge will extend to wild birds, game animals, fur-bearing animals, trees, wild flowers, and plants, while the Department of Commerce will have jurisdiction with respect to fishes, mussels, and other aquatic animal life. The two departments are authorized to make suitable regulations governing hunting and fishing on the areas acquired.

The bill became a law on approval by the President on June 7, 1924, and authorized appropriation not to exceed $1,500,000 for the acquisition of overflowed lands on either side of the Mississippi in Illinois, Iowa, Wisconsin and Minnesota, for a distance of about 300 miles from Rock Island, Ill., to Wabasha, Minn. The appropriation bill for the Department of Agriculture for the year beginning July 1, 1925, carried $400,000 for beginning the work.

The superintendent of the new refuge has established headquarters in the Post Office Building at Winona, Minn. He is actively engaged in locating available lands for purchase, in harmony with the desire of the department to be in position to carry out the purposes of the refuge with the greatest possible expedition.

The Biological Survey is working to obtain the cooperation of people in the Upper Mississippi Valley in the development and enjoyment of this wild-life refuge. When the lands are obtained and the refuge thoroughly organized it will be one of the greatest establishments of the kind in the possession of the national government. Here the wild animals, birds, and fishes will under careful conservation have opportunity to increase their numbers, and along with this, the public will be given the enjoyment of the sport of hunting and fishing to the fullest extent consistent with maintaining the wild life supply within the area in maximum abundance. The region is a beautiful and picturesque place in which great numbers may seek healthful recreation and sport in the out-of-doors.

The areas to be purchased for the refuge are specifically limited to the bottom lands between the river and the bluffs which rise precipitously on either side from 200 to 400 feet. The average price of the lands can not, under the law, exceed $5 per acre. In this region the Mississippi flows through a valley averaging 3 to 5 miles in width to the bluffs. At times of high water a large part of this area is overflowed and not suitable for agriculture. There are many permanent sloughs and bayous, some of them navigable to boats of light draft. Many of them are dry in summer, but the land exposed is not suitable for cultivation. To save the fishes in these cut-off bodies of water, the Bureau of Fisheries sends agents each year to return them to the Mississippi or carry them to other localities for restocking depleted streams. In this way hundreds of millions are rescued every year by federal and state agencies in one of the greatest spawning grounds in the United States for such species as bass, pike, sunfish and others.

The pearl-button industry, with an enormous annual output finds an important part of its raw material in the mussel shells obtained in the waters of this region. It is noteworthy that the spawn of certain shellfish can be disseminated only in the gills of certain fishes, so that the mussel-shell industry in this region depends for its existence upon the conservation of the fishes frequenting these waters. The industry will not only be unhampered by the creation of this reservation but by its establishment will be assured of perpetuity.

The Mississippi Valley is described as the great American highway for our migratory birds, and many of their feeding and resting places are found in the very midst of the new refuge. Quail and ducks have in the past bred here, and during migration the refuge is an ideal place for many species of warblers. The principal fur animals indigenous to these lands are muskrats, minks, raccoons, foxes, and skunks, and in the southern part some few opossums. These animals will be of no small economic importance in the legitimate uses of the refuge.

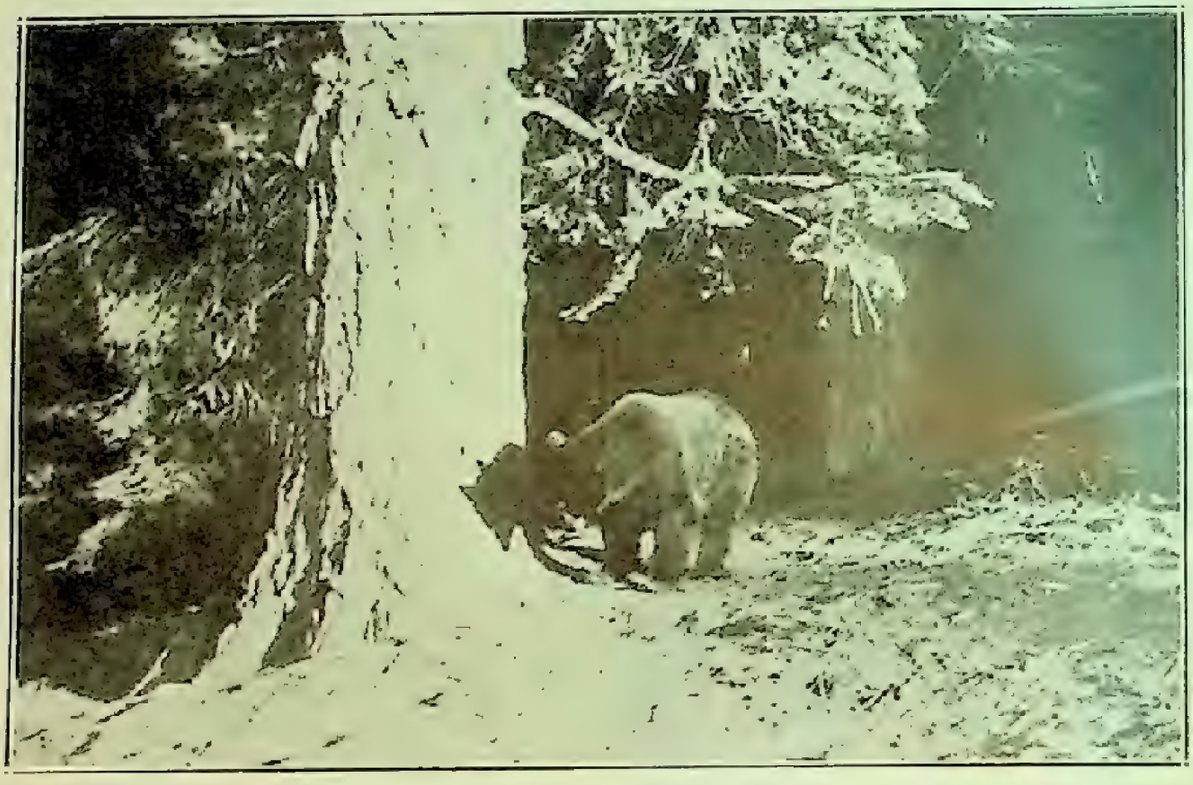

FIG. 47. Black bear in Sequoia National Park, September 2, 1925. Photograph by H. C. Bryant.

ONLY 30,000 ANTELOPE SURVIVE IN NORTH AMERICA.

Difficult as such an undertaking may seem, a careful census has been taken of the pronghorned antelope in North America, and the areas now occupied by these big-game animals approximately determined. The pronghorn is the only species of antelope native to America. Through the occupation of its territory by man it has been extirpated from many of its

former haunts but has survived in scattered small herds over a very large proportion of its original range in 16 of the western states of this country and in Canada and Mexico. In 1922 it became evident that the time had arrived for taking active measures leading to the conservation of the dwindling numbers of the antelope if its extermination were to be averted, and accordingly a census was conducted during the following two years by field men of the Biological Survey of the United States Department of Agriculture, with the cooperation of conservation societies, state agencies, and individuals not only in this country but also in Canada and Mexico. The results of this census constitute the larger part of a report just published by the department on the "Status of the Pronghorned Antelope, 1922–1924," by Dr. Edward W. Nelson, chief of the Bureau of Biological Survey, as Department Bulletin No. 1346.

According to the results reported by Doctor Nelson there are now approximately 30,000 pronghorn existing in North America in a total of 286 scattered bands. These numbers seem sadly meager in comparison with the millions once inhabiting this continent. It has been estimated that the buffalo herds of this country at one time numbered from thirty to sixty million animals, and in view of the greater territory occupied by the pronghorn, it may be considered a conservative estimate to place its probable original numbers at not less than thirty to forty millions, and probably more.

A factor favorably influencing the conservation of the pronghorn is the attitude of such leading conservation organizations as the Boone and Crockett Club, the Permanent Wild-life Protection Fund, the American Bison Society, and the Californian Associated Societies for the Conservation of Wild Life, all of which are interested in the future of the antelope. This factor together with the establishment of refuges and the execution of restocking experiments will play an important part in the conservation of the antelope.

Copies of the antelope bulletin may be obtained upon application to the United States Department of Agriculture, Washington, D. C.

NEW BULLETIN ON GAME LAWS ISSUED.

"Game Laws for the Season 1925–26," the twenty-sixth annual summary of federal, state, and provincial statutes relating to game, has been compiled by George A. Lawyer and Frank L. Earnshaw, game officials of the Biological Survey, and published as Farmers' Bulletin No. 1466, by the United States Department of Agriculture. The outstanding information presented is the summary of laws relating to seasons, licenses, limits, possession, interstate transportation, and sale, for each state and province, in the form of detailed but concise synopses, which should be highly useful to thousands of sportsmen hunting in their own and other states.

The authors state that the most important law relating to wild life that passed the last session of the sixty-eighth congress was the Alaska game law, which authorized the appointment of a game commission for the Territory of Alaska and broadened administrative and enforcement provisions on behalf of the department. Under the new law the department has promulgated regulations recommended by the Alaska Game Commission on game, birds, and land fur-bearing animals designed to afford better protection to the wild life of the territory.

Other federal legislation of the year includes the amendment of the Upper Mississippi Wild Life and Fish Refuge Act, an act authorizing two national parks in the eastern section of the United States, and several other parks and refuges. The migratory-bird refuge bill passed the house but did not reach a vote in the senate. The migratory-bird treaty act regulations were amended, changing the seasons in harmony with the views of conservation officials and sportsmen in the states affected.

The legislatures of all the states except Alabama, Kentucky, Louisiana, Maryland, Mississippi, and Virginia have been in session since the summary of the previous season was issued, and the authors of the bulletin state that the trend of legislation has been toward greater protection to game by shortened seasons and increased fees for hunting licenses, with special attention to refuges and sanctuaries.

The game-law bulletin is now being distributed to law-enforcement officials, conservationists, sportsmen and others as an aid in the administration of the migratory-bird treaty and Lacy acts, and copies can be had on application to the United States Department of Agriculture.

PRESIDENT RESERVES ISLANDS FOR NEW WILD-LIFE REFUGE

President Coolidge, by a recent Executive Order, has withdrawn from settlement, location, sale, or entry, all islands owned by the United States in the Missis-

sippi River between Rock Island, Ill., and Wabasha, Minn., and has reserved them for the use of the Department of Agriculture in connection with the establishment of the Upper Mississippi River Wild-Life and Fish Refuge. The islands are withdrawn in order that the Department of Agriculture may hold them as parts of the wild-life refuge from the start instead of having to buy them later from private owners. These islands, with other islands in the river north of Cairo, Ill., were first withdrawn from public entry in 1891 for the use of the War Department in connection with possible improvements of navigation on the Upper Mississippi but were restored to entry and disposal by the Secretary of the Interior, on April 25, 1925. The order of President Coolidge again retains under government ownership all islands within the limits of the new wild-life refuge.

GAME-LAW VIOLATORS FINED HEAVILY.

Unlawful trapping of fur-bearing animals in Alaska, with a view to later disposing of the skins commercially, will prove to be an unprofitable venture if fines recently imposed by the federal court can be taken as a criterion. One offender apprehended on the Katchatna River, 150 miles northwest of Anchorage, on July 15 by a deputy United States marshal and a United States game warden of the Biological Survey, United States Department of Agriculture charged with possession and transporting one beaver and nine muskrat pelts, was arraigned in court the next day and paid a fine of $200. Two other offenders apprehended at the same time and charged with the possession and transportation of 82 beaver pelts, on being arraigned in court, were each fined $500 and in addition sentenced to serve three months each in jail. Not only were all of the pelts seized but also a gasoline boat from one of the violators.

FIG. 48. Mule-tailed buck at Glacier Point, Yosemite National Park. Photograph by H. C. Bryant.

DUCK TIME.

The leaves on the trees are brown and
sere;
The grass is withered and dead,
And the sky is blue of the deepest hue
In the narrow chinks o'erhead.
So you pause, perhaps, in the city's streets,
As you level your gaze on high,
For you hear a call, through the dim
smoke-pall
When the ducks go drifting by.

The lure of the wild gets in your blood,
For the tang of the wind is sweet,
And your pulses burn as you long to turn
Where the land and the waters meet
Where the winds wail low through the
fringing sedge,
And withering cat-tails dry;
Where the ripples break on a dead calm
lake,
When the ducks go drifting by.

Then it's back to the wild, when the sun
comes up,
And the twilight dawn fades fast,
When you lay in your blind, for you hope
to find,
A shot as the birds drift past.
When the pin-tails quack in the feeding
grounds,
And the blue bills venture nigh,
Then a roar and flash—and the waters
splash
When the ducks go drifting by.

You who are chained to your desks of
wood,
In the heart of the busy hum;
Turn back a space for a breathing place,
When bracing November comes;
There's a hunter's camp, and a hunter's
life,
And many a shot to try,
And tales to tell by the fire, as well,
When the ducks go drifting by.

—*The Illinois Sportsman.*

FACTS OF CURRENT INTEREST.

On the opening day of the season near Bishop, Inyo County, a game warden checked over catches aggregating upwards of three thousand fish on one stream while covering a distance of approximately two and one-half miles. The largest trout recorded at Bishop weighed six pounds six ounces.

As a rule the passing of a city ordinance preventing hunting affects the hunter not at all, but when a city such as Los Angeles passes such an ordinance there is complaint because well known hunting grounds are thus eliminated.

The deer season proved an ordinary one. There was little complaint by experienced hunters.

One hunter killed a doe with forked horns north of Truckee. He made out an affidavit and sent the interesting specimen to the State Museum at Berkeley.

Striped bass fishermen have been enjoying fine sport but the fish caught have been small, seldom being over three pounds in weight.

President Newbert, Assistant Executive Officer Gilmore and Hatchery Superintendent Shebley attended an important meeting of the Tahoe Development Association on September 13, where fishing conditions in the Tahoe region were discussed.

Commissioner Zellerbach has been preparing himself for his new duties as Commissioner by studying conditions at the hatcheries. Conservation work as it is carried on in Oregon and Washington has been included and all under personal expense.

Many of the hatcheries are badly in need of repair in order to prevent serious depreciation and an effort is being made to secure approval of this construction work.

COMMERCIAL FISHERY NOTES.

N. B. Scofield, Editor.

COMMON NAMES OF COMMERCIAL FISHES.

In investigating the common names of fishes used by the fish buyers and dealers, some interesting cases of confusion in names in the same and different localities are evident. The most common cause of these tangles is the use of the same name for different fish in different districts. Another and also common error is that of a different name to be given the same fish in the same or different localities. It can readily be seen that this loose use of names could easily lead to errors in the statistical records of the fish catch of the state, and also give the wrong impression to persons inquiring into the species taken in the various localities. However, with an accurate record of what species the different names mean in the various districts, it can all be recorded accurately.

A good example of the same name being used for different fish in different places is the "sea trout" of Monterey and San Pedro. At Monterey a Hexagramid fish, *Hexagrammus decagramis*, goes under that name, while at San Pedro all small white sea bass, *Cynoscion nobilis*, are called "sea trout." These fish are widely different and *Hexagrammus decagramis* is not taken at San Pedro, so it can be seen that reporting "sea trout" from San Pedro would give an erroneous impression of the range of *Hexagrammus decagramis*, and the amount caught each year, as the name sea trout belongs to the Hexagrammidae and not to the small white sea bass. Neither fish, however, resembles a true trout.

There are a few instances where the fish buyers are not able to separate species that closely resemble each other, and are not of very frequent occurrence. This is true of the fishes called "black" or "blue perch" or "blue bass" in the markets at San Pedro. These were all supposed to be halfmoon, *Medialuna californiensis*, but upon investigation, it was found that fish of four different families and five species were included in this category. These were black croaker, *Sciaena saturna;* Pomacentridae, *Chromis punctipinnis;* green fish, *Girella nigricans*, the *Sargo anisotremus davidsoni* and the true halfmoon, *Medialuna californiensis*. These fish sell for practically the same price and are used for the same purposes, so no great diligence is shown by the market men in their separation.

One case of the demand for a fish bringing it into enough prominence to warrant a separate classification for it is the horse mackerel, *Trachurus symmetricus*. This fish was until recent years considered an inferior fish and sold in small quantities at a low price, and was thrown in with the rest of the mackerel, *Scomber japonicus*, our common mackerel of the Pacific Coast. Now, however, it is sold as "Spanish mackerel," at a higher price than the common mackerel, and in fairly large quantities. These fish are members of different families, the horse mackerel belonging to the Carangidae, the same family that the yellowtail is a member of, and the common mackerel to the family Scombridae.

There is no confusion in the names of the most important fishes such as the albacore, sardine or barracuda, and in the main buyers are very accurate in their separation of the species, and the names are used without variation in each locality. With a complete understanding of the local names, no confusion between the districts will result. This is all a good answer to the often asked question as to why a difficult and long scientific name must be fixed to each fish. If we did not have these universally used names as a basis to always fall back upon, we would imediately be lost in a maze of local and common names that would be altogether hopeless.—Joe A. Craig.

ALBACORE APPEAR NEAR SAN FRANCISCO.

Considerable excitement has been manifested among fishing interests over the recent large catches of albacore brought into San Francisco by crab and rockcod fishermen. Albacore has not been taken in quantities in this vicinity heretofore although it has been the general belief that the fish appear off the Farallon Islands during the late summer and fall of each year.

Frank Aliota, a rockcod fisherman who has had experience jig fishing for albacore in southern California waters, believing that this fish could be taken in quantities off San Francisco if the fishermen made a regular business of it and proper methods were employed, equipped his rockcod boat No. B-21 with jigs and lines and went out some fifteen or twenty miles west of the Farallon Islands on Sunday, August 30th. He returned on

Monday night with a catch of 449 pounds of albacore. Immediate interest was created among the fishermen and four boats left Fishermen's Wharf the following day returning on Wednesday with similar catches. Intense excitement followed the landing of their catch and twelve boats went out on Thursday returning with from 600 to 800 pounds of albacore each, while one boat brought in 1800 pounds.

N. B. Scofield, in charge of the Department of Commercial Fisheries of the Fish and Game Commission, examined the catches and found the fish to be very even in size, averaging from 22 to 24 pounds in weight each. Since no cannery in the vicinity was equipped with machinery suitable for handling albacore the fish were offered for sale on the fresh fish market. The fishermen, highly excited over their success and the prospects of developing a new fishery in this vicinity, talked of immediately starting preparations for opening a cannery in San Francisco to handle next year's catch. If albacore continue to be taken in quantities sufficient to warrant it, there is little doubt but what this will be done.

On September 8th, Rolin G. Watkins, the Commission's representative at Monterey, reported the appearance of albacore in Monterey Bay for the first time in many years was causing excitement among the fishermen there. Several tons were landed there during the ensuing week. Wilbur A. Selle of the laboratory scientific staff has taken measurements and gathered other biological data from the albacore taken at Monterey, in connection with a study of the life history and habits of this fish which is being conducted at the California State Fisheries Laboratory at Terminal.

CONSERVATION IN OTHER STATES.

NEW REFUGES FOR MANY STATES.

"Significant steps in the development of systems of refuges and recreational areas were taken in Connecticut and Kansas, where special provisions were made to coordinate state activities and resources along these lines. In Connecticut a commission was created on forests and wild life, composed of the state park and forest commission and the state board of fisheries and game, and was empowered to accept gifts and purchase real estate for parks or forest purposes: areas so acquired are to be maintained for the propagation and protection of wild life or for public shooting grounds. Kansas created a state forestry, fish, and game commission composed of the governor, state fish and game warden, and three commissioners—one from each third of the state—for the purpose of acquiring lands, water, and water rights and to accept donations or bequests on behalf of the state for the establishment and maintenance of public forestry, fish, and game preserves. The commission is also authorized to build and construct reservoirs or lakes, and dams for impounding water, and is given the right of eminent domain in this connection. It is required to police such areas and to make regulations for their public use. An appropriation of $40,000 was made from the fish and game fund for carrying out the purposes of the act.

New York established a conservation fund to consist of half the fees received from the sale of hunting, trapping, and angling licenses to be used for the establishment and maintenance of a state-wide system of fish and game refuges for the promotion of public fishing and shooting and the demonstration of forest management, including pertinent biological and research investigations. For the purposes of the act the commission is authorized to acquire lands and property rights by gift, purchase, or condemnation, or by appropriation in the manner provided for acquiring park lands.

In Illinois an appropriation of $365,000 was made to the department of conservation for the purchase of land and water for game refuges, game farms, rest areas, and public shooting and fishing grounds.

Oklahoma authorized the commission to purchase lands for the establishment of game refuges or game farms, but limited the cost of such lands to $10 an acre, except where buildings or cultivated lands are acquired, and provided for the approval of the governor on all contracts for amounts in excess of $1000. The Arbuckle Mountain State Game Preserve, with an area of 50,000 acres, was established on the property of Sherman Joines, who granted the state the right to protect game thereon.

Texas made provision for the establishment of state game refuges on private holdings which the owner may transfer to the state for periods of 10 years with the right to protect game and birds thereon.

Montana enlarged the powers of the commission with reference to the creation of game refuges, and Pennsylvania now provides that auxiliary refuges may be created on any lands in the state and reduced the distance required between such refuges from 5 to 2 miles. Pennsylvania also enacted another provision which will facilitate the establishment of auxiliary refuges on private lands by allowing the owners to use such lands for all purposes other than hunting and trapping.

New Hampshire retains the 1000-acre limit on the area of refuges on private holdings but increased the area to not more than 10,000 acres for those established on federal or state-owned lands. With the consent of the governor and council, the feeding and resting environment of areas inhabited by wild life may be improved.

California created five new game refuge districts, and Utah established the Timpanogas, Ashley, Gentry Mountain, Crescent Canyon, and Pleasant Creek Preserves. Maine established the West Bath Preserve in Sagadahoc County and another in Knox County. South Dakota added three sections to the Sisseton Game Preserve, making the total area 19,840 acres. Minnesota provides that refuges for waterfowl may be established only on lakes and lands adjacent thereto. In Nebraska a game-bird refuge was established in Garden County by closing the Platte River to hunting a distance of about 30 miles. Tennessee established a refuge adjoining Lenoir City, Loudon County, and Oregon created two new refuges.

Manitoba created the Hillside Refuge of one-half section and the Assiniboine Refuge for moose, deer, and caribou or reindeer, comprising 612 sections.

Under the migratory-birds convention act, the Canadian government set aside 11 new bird sanctuaries in Saskatchewan for the protection of game birds during the breeding season in addition to those already established in that province and in Alberta, and with the concurrence of the Province of Quebec 7 additional bird sanctuaries on the north shore of the Gulf of St. Lawrence. These latter sanctuaries are small groups of bare, rocky islands, the breeding grounds of thousands of valuable eider ducks and other migratory sea birds. Through recent orders in council 50 areas have also been set apart as public shooting grounds designed to afford the public facilities for hunting in the open season. These include 32 in Alberta, 12 in Saskatchewan, and 6 district areas in Manitoba. The Manitoba and Saskatchewan shooting grounds are much larger than those in Alberta. These reservations safeguard breeding places of the birds and with the bird sanctuaries increase the number of specially protected nesting grounds in the important wildfowl sections of the Canadian prairies, where the majority of the continent's waterfowl nest.

During the last session of the Alaska legislature $10,000 was appropriated for the territorial game commission to stock areas on islands and elsewhere with game and fur-bearing animals. This gives an opportunity to increase the game and fur output of Alaska by introducing these animals in places which appear to be perfectly suitable for their requirements. This work has been in progress for several years under the Biological Survey, and the appropriation will increase opportunities for constructive work along these lines.—U. S. Dept. Agric., Farmers' Bull. No. 1466.

MINNESOTA SHOOTS DEER IN EVEN NUMBERED YEARS ONLY.

Minnesota has been experimenting on a new type of deer law which provides for the shooting of deer of either sex and all ages in even-numbered years. The Commissioner of Fish and Game has recently published a statement to the effect that this does not operate effectively in the interest of deer conservation. "Minnesota is not giving deer adequate protection necessary to the preservation of that species when it permits indiscriminate shooting at any time. The effectiveness of the "one buck" law has been proved by the experiences of the states and the United States government in Alaska and Canadian provinces, where such a law is in effect.

PENNSYLVANIA CONTINUES TO INCREASE DEER KILL.

Statistics from Pennsylvania give the number of upland male deer killed the past few years as follows: 1915, 1287; 1918, 1754; 1920, 3300; 1921, 4840; 1922, 6115; 1923, 6452; 1924, 7778.

Even though some of these figures may be due to better machinery for obtaining statistics, yet it appears that the deer kill has actually increased progressively. Game conservation officials of that state give the buck law (passed in 1907) much of the credit for this increase.

LAW CHANGES IN MONTANA.

An inclusive bill relative to fish and game, after a stormy passage and with many amendments finally became a law in Montana. Among the interesting changes were the following: ptarmigan was added to the list of upland game birds; mink was taken from the predatory animal list and put with the fur-bearers; skunk, civet cat and black-footed ferret were added to the list of predatory animals. A bounty fund of $7,500, to be matched by a similar fund from the Live Stockmen's Association, was set aside. The season on Rocky Mountain sheep and goats was closed, but the Commission is given power and authority to open the season for limited periods of time and to establish bag limits.

OREGON GAME COMMISSION REORGANIZED.

With the appointment of W. L. Finley of Jennings Lodge, formerly State Biologist, as Game Commissioner, and a reorganization of the Game Commission, a number of changes were made. Resignations were accepted of the executive officer, hatchery superintendent and educational director. The sportsmen of Oregon, as in similar cases, are expecting increased efficiency as a result of the shake-up.

MINNESOTA ACTS ON FISH REFUGE.

Minnesota was the first of the four states interested to pass an enabling act granting to the federal government the right to acquire land and water areas necessary to the establishment of the upper Mississippi River wild life and fish refuge as created by congress. The act cedes to the federal government all areas of land subject to overflow and not settled for agricultural purposes.

NEW JERSEY AT LAST PROTECTS BOBOLINK.

For many years the bobolink was considered a pest in southern rice fields and the birds were killed in enormous numbers under the name of "reed birds." Audubon societies have been active in attempting to secure protection for this bird, and after many attempts protectionists in New Jersey succeeded in getting a bill through the last legislature which gives protection to this species.

ENGLAND STILL FIGHTS FOR WILD BIRDS PROTECTION BILL.

Continuing their fight for better laws, proponents of the Wild Bird Protection Bill, which passed the House of Lords in 1923, are supporting the same measure introduced in the House of Commons. The provisions of the new bill are almost identical although the wording has been rearranged. The act, if passed, will be much simpler and will cover legislation now comprised in ten acts. Several sections are designed to prohibit the catching of song birds for aviary use. Provisions requiring taxidermists to keep a record of their specimens and for the granting of licenses for scientific collecting are included.

LIFE HISTORY NOTES.

WOLF FISH TAKEN AT PACIFIC GROVE.

On July 18th, a species of lancet or wolf fish, *Alepisaurus asculapius*, came into shallow water at Pacific Grove where it was speared by several boatmen. This strange fish of the great depths is rarely seen on the Pacific coast and, consequently, no little interest was shown by its occurence this summer. Only a few specimens have been reported in California, although records show that this fish is occasionally cast ashore on the coast of Alaska where it is called "Sabatka" by the natives. One specimen was reported from Eureka, California, in 1892; another appeared at San Luis Obispo in 1894. In 1920 another specimen was obtained at Pacific Grove, but this one apparently was not reported. It, however, was preserved at the Hopkins Marine station where the present specimen is being kept.

The most striking features of this odd fish are its spindle-like body and sharply pointed head. Its large mouth is filled with long lance-like teeth, which, with other body peculiarities, earn for it the name lancet or wolf fish, and which are indeed ferocious weapons of offense and defense. All parts of the body are very fragile. The bones are quite feeble and loosely connected by the ligaments, so that the body can be considered stretched. Dr. Gunther, a well known ichthyologist states: "This loose connection of the parts of the body is found in numerous deep sea fishes, and is merely the consequence of their withdrawal from the pressure of the water to which they are

exposed in the depths inhabited by them. When within the limits of their natural haunts, the osseous, muscular, and fibrous parts of the body will have that solidity which is required for the rapid and powerful movements of a predatory fish. That the fishes of this genus (*Alepisaurus*) belong to the most ferocious of the class is proved by their dentition and the contents of their stomachs."

The dentition is indeed well developed. The upper jaw contains a series of very small teeth along its entire edge. The vomer bears three dagger-like canines each over an inch long and arranged in a triangle. The palatines also contain three canines on each side, but smaller than those on the vomer. Eight saw-like teeth are arranged behind these. The lower jaw has two large canines in front with a series of nine small ones behind these. Following these are five more large canines, somewhat smaller than those on the vomer, and fifteen sharp saw-like teeth, making in all a very complicated dental formula.

Our specimen, a female four feet and four inches in length, followed the detailed description of Jordan and Evermann in all respects except the dorsal fin count which seems to vary. This specimen, like most others observed, proved to be thickly infested with parasitic worms (*Tetrarhynchus*) which were embedded in the flesh and viscera. The ovaries contained numerous, almost transparent eggs and were readily teased from the ovarian membranes; however, they did not appear to be ripe.

Contrary to what one might expect, this typical deep water fish fed on animals which are usually regarded as pelagic. Two squid (*Loligo*) and a small shark (*Mustelus*), all in good condition, were taken from the stomach. This would lead one to believe that the wolf fish had been forced ashore at the time, or shortly after, it had caught its meal, for the food showed no signs of being digested. It is of course possible that the fish captured its prey after it had risen from deeper water, but doubtless the greatly reduced pressure at the surface affected its swimming movements as well as its feeding habits, and so it seems improbable that such was the case. A slender unidentified fish, approximately one foot long, was removed from the unusually long caecum. As the stomach contents of other specimens have proven that this fish eats its own young, it is not impossible that this unidentified fish was a small *Alepisaurus aesculapius*.

Fish of this family have never been taken in deep sea dredges or trawls, and only one species, which occurs in the Atlantic, has been taken on hook and line. Practically all of the known specimens have come to the surface in a helpless condition, possibly driven up by the torments of parasites, as some authorities claim, or by storms which often disturb life even in great depths, or by other deep sea animals which may have forced them above their customary low level.—*W. A. Selle*, Terminal, Cal., August 28, 1925.

WOLVERINE DISPUTES TRAIL.

The Sierra Nevada wolverine (*Gulo luscus luteus*) once a fairly common mammal in mountain districts is now seldom encountered even by the trapper. Even in the southern Sierra Nevada, the territory of greatest abundance, a face to face encounter is sufficiently unusual to make a record of it worth while.

On August 18, 1925, when going from Colby Meadow to Evolution Basin in the watershed of the South Fork of the San Joaquin River I looked up to see a wolverine come running down the trail toward me. Either he did not see me or he thought he had the right of way for he came up to within eight feet of me. Meanwhile I began fumbling in my lunch bag for an automatic hoping to secure a specimen for a museum. Before I could locate my firearm the wolverine decided to retreat and succeeded in making his get-a-way before I could fire at him.—Norman Clyde, Independence, Cal.

REPORTS.

GAME CASES.

April, May and June, 1925.

	Number arrests	Fines imposed	Jail sentences (days)
Violations of Hunting License Act	8	$258	2
Deer—killing, possession, closed season	8	220	
Deer—killing, possession, does, fawns, spike bucks	2	125	
Ducks—killing, possesseion, closed season	2	30	
Doves—killing, possession, closed season	6	95	
Wild pigeons—killing, possession	1	25	
Quail—killing, possession, closed season	4	25	
Pheasants—killing, possession	1		
Rabbits—cottontail, brush, killing, possession, closed season	5	100	
Squirrels—killing, possession	1	25	
Nongame birds—killing, possession	5	12	
Trespass	2	25	
Wood ducks—killing, possession	1		
Beaver hides—illegal possession	2	125	
Bear—killing, possession, closed season	1	50	
Mountain sheep—killing, possession, closed season	3	100	
Totals	52	$1,215	2

FISH CASES.

April, May and June, 1925.

	Number arrests	Fines imposed	Jail sentences (days)
Violations of Angling License Act	43	$530	11
Violations of Commercial Fishing License Act	14	280	
Trout—closed season	44	960	
Trout—undersized, over limit	6	175	
Striped bass—over limit, undersize	33	875	
Crabs—undersize	1	25	
Clams—undersize, over limit	46	1,430	10
Abalones—undersize, over limit	34	925	
Lobsters—over limit, selling, closed season	8	220	
Barracuda—undersize	2	50	
Black bass—possession closed season	4	65	
Crappie—possession, closed season	2	45	
Salmon—over limit, sale, closed season	4	175	
Shad—other than hook and line	2	40	
Illegal night fishing	1	25	
Nets, illegal possession or use	9	1,000	
Illegal shipment, concealed packages	2	25	180
Illegal fishing—250 feet of a fishway	10	175	
Fishing in a closed district	3	75	
Totals	268	$7,101	201

SEIZURES OF FISH AND GAME.

April, May and June, 1925.

Quail	2	Lobsters, pounds	1,25
Doves	10	Crabs	1,416
Pheasants	2	Abalones	489
Nongame birds	1	Salmon	36
Deer meat, pounds	41	Black bass	3
Rabbits	3	Crappie, pounds	5
Trout	600	Calico bass	10
Striped bass, pounds	1,773½	Perch	9
Barracuda, pounds	1,000	Beaver hides	11
Pismo clams	2,237	Nets	1
Razor clams, pounds	20		

STATEMENT OF INCOME.

April, May and June, 1925.

	Detail	Total
License sales:		
Angling	$27,116 00	
Hunting	92,708 00	
Market fisherman's	17,200 00	
Trapping	355 00	
Wholesale fish packers' and shell fish dealers'	10 00	
Game breeders	82 50	
Fish breeders'	25 00	
Total license sales		$137,520 50
Other income:		
Court fines	$10,782 00	
Fish packers' tax	47,410 21	
Fish tag sales	825 00	
Game tag sales	10 04	
Interest on bank deposits	791 61	
Sale of beaver hides	296 00	
Crawfish inspection	300 00	
Sale of launch "Barracuda"	300 00	
Total other income		$60,714 89
Total income		$198,241 39

STATEMENT OF EXPENDITURES.

For the Period April 1, 1925, to June 30, 1925, of the Seventy-sixth Fiscal Year.

Function	Materials and supplies	Salaries and wages	Service and expense	Property and equipment	Total
Administration:					
Commissioners			$366 53		$366 53
Executive offices	$100 33	$4 634 69	1,212 60	$340 00	6,287 62
Printing	3,100 70				3,100 70
Research and publicity	38 85	1,861 00	431 18	138 58	2,472 61
Accident and death claims			3,322 70		3,322 70
Department totals	$3,239 88	$6,495 69	$5,330 01	$478 58	$15,550 16
Commercial fish culture and conservation:					
Superintendence	$3 23	$2,565 00	$787 34		$3,349 11
Inspection and patrol	2,166 36	4,341 62	1,311 38	$35 37	7,854 73
Research	1,697 18	4,411 00	2,294 22	13 95	8,416 35
Statistics	369 08	1,573 38	24 30		1,966 76
Propagation and distribution of salmon	3,226 57	2,033 43	137 76	252 84	6,250 60
Department totals	$7,395 00	$15,524 43	$4,555 00	$302 16	$27,777 55
Sporting fish culture:					
Superintendence	$24 36	$2,550 00	$876 18		$3,450 54
Special field investigations		600 00	310 36		910 36
Printing	89 95				89 95
Propagation and distribution of trout	11,850 51	19,083 39	3,887 75	$868 87	35,690 52
Department totals	$11,964 82	$22,233 39	$5,074 29	$868 87	$40,141 37
Patrol and law enforcement:					
Prosecutions and allowances					
General patrol	$968 37	$37,229 53	$25,958 42	$55 95	$64,210 27
Fish and game conservation:					
Game bird introduction	$1,812 30	$970 51	$4,327 98		$7,110 79
Game farms		375 00	273 93		648 93
Mountain lion hunting			1,630 00		1,630 00
Mountain lion bounties					
State Fair exhibit					
Department totals	$1,812 30	$1,345 51	$6,231 91		$9,389 72
License commissions			$12,333 60		$12,333 60
Tahoe camping grounds	$90 45	$40 00	16 54	$5 50	150 49
Grand totals	$25,480 78	$82,868 55	$59,503 77	$1,700 00	$169,553 10

CALIFORNIA FRESH FISHERY PRODUCTS FOR MONTHS OF APRIL, MAY JUNE, 1925

Species of Fish	Del Norte, Humboldt	Mendocino, Sonoma, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Alameda, Contra Costa	San Francisco, San Mateo	Santa Cruz	Monterey	San Luis Obispo, Santa Barbara, Ventura	Los Angeles	Orange	San Diego, Imperial	Total	Mexican, brought into California via San Pedro	Mexican, brought into California via San Diego	Total Mexican fish brought in
Albacore											762,171	3,270	565,568	1,331,012	512,480		512,480
Anchovies							3,450		1,400		43,760			48,610			
Barracuda										269	3,377,462	29,495	493,859	3,901,085	111,511	5,955	120,466
Bluefish									3,043					3,043			
Bocecaccio		67					14,109	07,079	43,706	318				125,279			
Bonito											21,826	1,399	29,585	55,810			
Carp		182		714	4,076	10,068	1,436							16,476			
Catfish					44,556	16,037								60,893			
Chilipepper							25,908	2,866	34					28,808			
Cultus Cod	5,593	3,007					48,281	14,326	11,812		2,317			86,326			
Dolphin																	
Eels							25			116				141			
Flounders	873	390	82			220	42,951	84,097			457	52		120,105			
Grayfish							3,565	450			270	117	27,119	41,521			
Greenfish																	
Hake							1,102	2,250						3,712			
Halibut	3,614	4,921	2,090				2,396	1,218	979	61,078	240,275	18,045	68,756	416,002	5,266	168,571	173,840
Hardhead																	
Herring			1,125				2,400							3,525			
Kingfish							96	6,574	18,475		103,063	791	4,004	133,003		50	50
Mackerel								134	50,044	32	402,619	52,829	139,212	644,870			
Marlin																	
Mullet																	
Perch	1,097		8,299				6,570	1,956	9,793		19,898	7		57,530	1,010		1,010
Pike					359	785								11,87			
Pompano											53,25		45	53,70		60	60
Rock Bass										16	51,071	3,005	76,306	130,458		301	301
Rockfish	2,893	1,122					121,977	16 671	18,314	22,615	513,296	2,580	315,415	1,074,913			
Sablefish							158,780	35,821	210		490			195,310			
Salmon	1,238,790	175,249		101,050	183,626	650,300	650,305	181,233	505,763					3,698,415			
Sanddabs		1,430					338,991	120,919	439		1,778	62		463,619			
Sardines							118,335		923,423	118	21,318	270	1,051,182	2,117,646			
Sculpin									1,659	63	24,528	505	4,122	30,877			
Sea Bass—Black										420	6,418	2,948	28,385	38 171	750	15,323	16,082
Sea Bass—White							65		605	16,372	324,179	6,031	67,772	415,624	6,134	30,045	36,179
Sea Trout													315	315			
Shad				26		40	41,758							44,824			

Shad—Buck				105,398	20,385	678,981	515							$14,279				
Shad—Roe				171,529	39,499	1,001,011	3,526							1,275,565				
Sheepshead										5,001	4,714	16	2,410	12,141		270	270	
Skates							22,143	10,811			13,79	31		31,367				
Skipjack													25	25	197,163	212,067	403,235	
Smelt	3,256	4,061	1,013				20,552	17,33[illegible]	3,672	26,813	53,822		614	133,175		210	210	
Sole	1,744	55,385					1,400,000	750,065	40,313	58,514	2,570	1,500	491	2,308,368				
Splittail																		
Striped Bass			1,257	29,639	59,624	74,000	53,036							218,516				
Stingaree																		
Suckers							497							497				
Surf Fish																		
Swordfish													4,255	4,255				
Tomcod							210							210				
Trout—Farm																		
Trout—Steelhead											121,230			121,230	33,130		33,130	
Tuna											381,111		36,746	417,857	33,406		33,406	
Tuna—Bluefin															1,634,473	498,699	2,133,172	
Tuna—Yellowfin																		
Turbot			1,573											1,573				
Whitebait	24,418		289				8,608							33,315				
Whitefish										675	121,67	132	13,096	26,670				
Yellowtail											289,408	315	173,822	463,575	322	4,587	4,909	
Miscellaneous	169	59					516	9,550	2,119	2,698	25,121	527		40,762	6,400		6,400	
Total fish	1,292,347	246,835	18,758	408,356	361,475	2,501,435	3,095,616	1,327,095	1,635,703	193,718	6,856,065	121,713	3,146,851	2,120,880	2,515,089	936,174	3,481,263	
Crustaceans																		
Crabs	[1]59,832	[2]501	[3]1,200				[4]989,112	[5]15,744	[6]1,080					[7]1,068,168				
Ecrevisse																		
Shrimps			106,073				221,370							387,443		57,194	57,194	
Spiny Lobsters																		
Mollusks																		
Abalones									685,325	8,552				693,877				
Clams—Cockle			271											271				
Clams—Mixed	2,932	819	13,885										715	18,381				
Clams—Pismo									60	87,948				88,008				
Clams—Softshell			10,035			28,364	10,601							66,403				
Cuttlefish							5,735	2,951	33,913		20			42,628				
Limpets																		
Mussels							4,512			35				4,547				
Oysters—Eastern			[8]1,862				[9]106,801							[10]111,666				
Oysters—Native			165											165				
Snails																		
Squid									871,617		155		3,495	875,267				
Miscellaneous																		
Frogs (doz.)																		
Terrapins (doz.)																		
Turtles																		
Totals	1,355,111	248,158	221,345	408,356	361,475	2,529,799	4,442,153	1,345,790	3,228,328	290,253	6,856,249	121,713	3,151,094	24,565,731	2,515,089	993,368	3,538,457	

All amounts shown in pounds unless otherwise specified.
[1]2493 dozen.
[2]51 dozen.
[3]21 dozen.
[4]22, 100 shell oysters.
Albacore and skipjack cleaned.
[5]41,213 dozen.
[6]185,475 shell oysters.
[7]656 dozen.
[8]70 dozen.
[9]44,507 dozen.
[10]507,575 shell oysters.

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1925 ABSTRACT CALIFORNIA FISH AND GAME LAWS 1926

WHITE SQUARES INDICATE OPEN SEASON — NUMBERS IN SQUARES ARE OPEN DATES

THIS ABSTRACT WILL BE VALID UNTIL 90 DAYS AFTER ADJOURNMENT OF THE 1927 LEGISLATIVE SESSION

	DISTRICTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT	NOV.	DEC.	BAG AND POSSESSION LIMITS, ETC.
DEER	1-1½-4½										15			No Does, Fawns or Spike Bucks Nor Forked Horned Muledeer in Dist. 1½ No sale of Venison or Deer Skins Two Bucks per Season. See Notes 8-9-10-14-15-16
	1½									15	15			
	2-2½-3									14				
	4-4¾									16	15			
Rabbits—Cottontail and Brush	ALL													15 per day. 30 per week No limit in District 4
Tree Squirrels	ALL													Closed until September 1st, 1927
Elk, Antelope, Mountain Sheep, Sea Otter, Beaver*	ALL													Killing of Elk or possession of Elk meat a felony $1,000 fine for Sea Otter
Bear, Fur Animals	ALL										15			See Notes 11-12
Ducks, Geese, Jack Snipe, Mud Hens	ALL	15												See Notes 4-14-15-16
Rail, Wood Duck, Wild Pigeon, Shore Birds (Except Jack Snipe)	ALL													
Quail—Valley, Desert and Mountain	ALL EXCEPT 1½													Valley and Desert 15 per day. 30 per week Mountain 10 per day. 20 per week
	1½													
Sage Hen	ALL								15					4 per day. 8 per week
Dove	ALL Except 4-4½-4¾													15 per day. 30 per week
	4-4½-4¾													
Grouse	ALL									15	14			4 per day. 3 per week
Pheasant	4¾												7	6 per season
Trout (Except Golden), Whitefish	1-1½-2-3 4-4½ Lake Almanor													Bag limit for taking and possession, 25 trout or 10 pounds and one trout or one trout weighing 10 pounds or over per day. For other restrictions See Notes 19-20-24 36-37-39 40-42 On this Card
	2†		14											
	23-24-25					30								
	See Notes 25-26													
	1½ Winter													Bag limit for taking and possession, 5 trout regardless of weight per day
	2-3-10 Thin Waist												15	
	2-2½-10 Spear													Bag limit for taking and possession, 1 trout per day
Golden Trout	ALL						30				1			20 per day. None under 5 inches
Black Bass, Sacramento Perch and Crappie SEE NOTE 44 FOR DISTRICT 4½	ALL													25 per day. No Black Bass under 7 Ins.
	Clear Lake in Lake Co.													Clear Lake 10 per day. No sale Hook and line only
Sunfish	ALL													25 per day. Hook and line only
Striped Bass, Shad	ALL													See Note 23
Salmon	15						15							See Note 27 for other districts, limit etc.
Crabs	ALL							30				15		See Note 28
Abalones	ALL	14			16									See Note 33
Pismo Clams	17													See Note 32
Spiny Lobster	ALL										15			See Note 28

LICENSE PROVISIONS

HUNTING LICENSE — License Year July 1 to June 30
Residents, $1.00. Non-Residents, $10.00 Declarant Aliens, $10.00. Other Aliens, $25.00.

ANGLING LICENSE — License Year January 1 to December 31
Residents, $1.00. Non-Residents, $3.00. Aliens, $3.00.
No angling license required of those under 16 years of age.

TRAPPING LICENSE — License Year July 1 to June 30
Citizens, $1.00. Aliens, $2.00 Under 18 no license.

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